Vol. 42, No. 3 March, 1945

Psychological Bulletin

# THE PRINCIPAL TRAIT CLUSTERS FOR DESCRIBING PERSONALITY

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## I. The Nature of Personality Description through Clusters

Only recently has the comparatively stern truth become widely realized by psychologists, first, that research into the underlying mechanisms of personality functioning cannot advance more rapidly than the ability to describe personality, and, secondly, that prediction regarding personality cannot exceed in accuracy the exactness with which personality can be measured. In response to this realization the development of a foundation for personality description and measurement has passed from the stage of clinical, experiential assessment in terms of syndromes and types to more sensitive and exactly quantitative methods, based on correlation and aiming ultimately at measurement in terms of clusters and factors.

Actual studies dealing with the intercorrelation of personality variables, either as clusters or as factors, on an adequate scale and by methods which permit of mutual confirmation of findings, are, nevertheless, still distinctly rare, perhaps because of the considerable labor and technical skill which they require. However, since the need for a foundation, even though an incomplete one, is urgent if much present research effort in personality study is not to be wasted, the moment has come to review what has become available in this field and attempt a preliminary integration.

The present contribution appraises the data of available studies, presents some fairly extensive new data not previously fully published, sifts the findings into an accessible catalogue form and gives structure to the field. It is confined to the description of personality by clusters and omits all that has to do with the further and more debatable interpretation in terms of factors. The 'Nuclear Clusters' required for the description of the total personality are finally presented in a single chart.

In order to side step, at the outset, much current confusion appearing in this field of discussion, it is necessary to indicate briefly how the terms syndrome, cluster, factor, type, trait and trait element are considered

to be related. A syndrome is, of course, a collection of traits, symptoms or trait elements which repeatedly occur together in individuals. A correlation cluster is a set of traits which intercorrelate highly, each with every other, so that high endowment in one trait will tend to appear with high endowment in the others, as an observable clinical syndrome. *Continuous* types—but not discontinuous, or *species* types—also present, at their polar extremes, syndromes. Correlation cluster, syndrome and type are thus, in this sense, aspects of one and the same relation. A trait has to be established, like a syndrome, by observing co-variation in a number of trait elements or restricted pieces of behavior. Hence the difference between trait and syndrome seems to have become, in current psychological literature, nothing more than a matter of extensity or degree. In addition, the term trait has retained a second and widely generic reference, covering any mode of personality manifestation whatever.

The search for what might be called basic traits, principal syndromes or major type forms, in terms of which personality differences may be most succinctly described, has gone ahead in recent years, in accordance with the above viewpoint, in the form of researches to discover what trait elements covary, either in the sense of factors or as clusters. Owing to the indeterminacy of factor analytic solutions, however, a considerable proportion of the workers seem to have preferred the cautious path of describing by clusters rather than by factors. The present writer has suggested that (5) the pattern of behavior commonly referred to by the term trait, in the most universal and useful form of the concept, corresponds to a factor rather than a cluster (6) and has propounded new criteria by the use of which the factor analytic solution of matrices of trait element inter-correlations may be made more determinate and psychologically real (7).

Both cluster and factor methods of recording inter-correlations in simplified form, however, have their use in the progress of personality research. They are not mutually exclusive: clusters, like correlation coefficients themselves, represent the data at a descriptive level; factors at an interpretive level. The functional unities or syndromes corresponding to clusters may be called manifest or *surface traits*. The pattern of elements sharing a heavy loading with any one factor, on the other hand, may be called a *source trait*, for behind that pattern we may expect sooner or later to find a common source or cause. As may have been demonstrated elsewhere (5) it is the source traits, rather than surface traits, which permit of being meaningfully and insightfully sub-divided into *dynamic*, *environmental mold* and *constitutional traits*.

The present review, as indicated above, intends to stop at surface traits. The advantages sometimes asserted for formulation in terms of surface traits are that

1. They are easier to extract than factors, involving less calculation from the matrix.
2. They are less indeterminate and arbitrary.
3. They are psychologically more real.
4. The findings of different researches can be more easily combined at this level.

None of these assertions is true without such modifications as sometimes invert the advantage. When resolving into clusters it is necessary for the experimenter to choose a minimum level of correlation with other traits in the cluster which any candidate trait must surpass in order to be admitted. (This is usually fixed, for no very dominant reason, at about 0.4 or 0.5, giving a mean inter-correlation in the cluster of about 0.60 to 0.70.) For this reason clusters are arbitrary, for the outline of the cluster, i.e., the pattern of traits admitted, may vary a good deal in response to change of admission level as the shape of an island in shallow seas varies with the tidal level. Again, no proof has been offered that clusters are more real and meaningful, in the sense of being more permanent in form, more constant in their re-appearance in correlations taken in different circumstances or more obviously psychologically meaningful. Indeed, in this respect the factor probably has a better claim (5). Finally, regarding facility of resolution, it is commonly overlooked that the extraction of clusters from a large matrix (of, say, more than fifty variables) can be more laborious than resolution into factors (8). Most of the advantages claimed for the cluster are thus illusory.

However, some of the advantages, in the field of objectivity and utility, which the cluster potentially possesses, can be assured if the facts about its real nature are kept in mind and appropriately handled. First one has to realize that most matrices will not resolve into a set of perfect text-book clusters, distinct and self-contained, but only into a ragged network of inter-related clusters. Secondly the situation is clarified if, in unravelling this network, one distinguishes between *phenomenal clusters* and *nuclear clusters* (6, 8). Generally the recorded clusters satisfying the correlation requirement—and which we may call phenomenal clusters—will show mutual overlap about certain nuclear groups of traits. These traits in the nuclear region may be called a nuclear cluster (D in Diagram I below) while the outlying portions (A, B and C in the diagram), remains of the phenomenal clusters, can be regarded as appendages of this nucleus.

Now it will be seen that the outlines (and therefore the psychological interpretation) of a cluster are arbitrary to the extent that a lowering of the correlation giving admission to clusters will variously extend the clusters, bringing, for example, various appendages within the nuclear cluster, enlarging the cluster generally and even fusing two

previously separated clusters. (As, to pursue our analogy, a receding tide may change two islands into one island.)

The actual data of the main chart below show several instances of the difficulty of identifying, or combining, clusters which results from variations of standard between researches. In sectors CB (Dominance) and D (Sociability), for example, the clusters of Maurer and of Maslow,

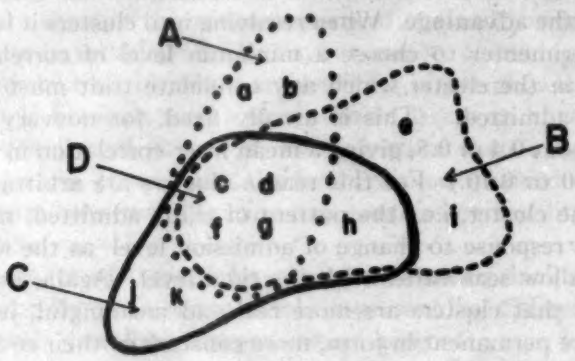


DIAGRAM I

First Phenomenal Cluster, contains variables a, b, c, d, f, g
Second Phenomenal Cluster, contains variables c, d, e, f, g, h, i
Third Phenomenal Cluster, contains variables c, d, f, g, i, k
Nuclear Cluster, contains variables c, d, f, g

adopting less rigid standards of admission, repeatedly straggle over the more restricted cluster nuclei found by Tryon, Sanford, Flemming, McCloy and others.

This relativity or arbitrariness of the cluster, as well as the steps to be taken to control it, become more evident if correlation coefficients are expressed graphically as cosines of angles, as in Diagram II below. When the criterion is that each trait must have a correlation of +0.80 or more with any other trait (Cos 37° = (approx) +0.80) the pencils of traits represented by A, B and C will each represent a cluster (providing, for simplicity, we keep the correlations in two dimensions). It is still, however, arbitrary to draw the line between these clusters at any point, for the trait lines are scattered pretty evenly between the extremes of A and C. If now the criterion be lowered to an r above 0.27 (Cos 74° = 0.27), either A and B, or B and C will constitute (or could constitute) a single cluster, respectively labelled X and Y, as indicated.

The dangers of adding together, to produce a single cluster, a number of clusters found to have some similarity and overlap of traits are now graphically evident. For if A, B and C were consecutively overlapping clusters (as they would be if the angle of each were extended

by a trifle), i.e., if three researches gave three clusters such that A had something in common with B, and B seemed psychologically to resemble C, some of the traits in C could actually have zero and negative correlations with those in A (i.e., be separated by more than a right angle in the diagram). With data in three or more dimensions (as most personality data seem to be) so ready a transition into negative rela-

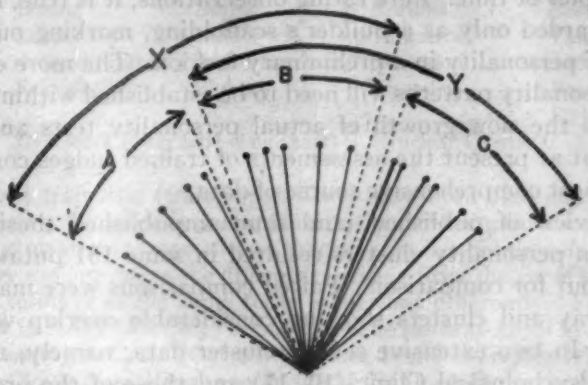


DIAGRAM II

tions is less likely, but it is obvious that the following precautions need to be observed.

1. Put together only clusters having a substantial common trait population.
2. Be prepared to meet situations in which there is actually no natural boundary and in which separate clusters are artificially created by the limits of correlation adopted for clusters, i.e. in which a concatenation of clusters is carved out of a continuum of traits.
3. If such a cluster concatenation is allowed to make a single 'sector,' under a single label, one must recognize that clusters at the beginning of the sector may actually have negative correlations with those at the end. In such circumstances it is best to find some natural cleavage point, however slight, at which the chain of clusters can be split to give sectors in each of which all clusters are positively inter-related. Thus sector A in the chart has been split into AA, AB and AC, though actually nuclear cluster AA1 still seems to have some positive correlation with AC2. Without these breaks the range would, however, be considerable, for AA1 has to do with conscientiousness and good character integration, whereas AC2 has to do with freedom from a kind of temperamental schizoid imbalance.

## II. PRINCIPLES IN COLLATING RESULTS FROM DIVERSE RESEARCHES

Correlation clusters have been established, by various researches to date, with respect to individual differences in terms of 1. Ratings by observers, 2. Self-ratings in questionnaires, 3. Test performances. The present inquiry is confined to data of the first kind; for personality

tests are in their earliest irresponsible infancy, while the data from questionnaires, though of interest in itself, are different in meaning and validity from that obtained through outside, objective observations of behavior. Moreover, only through rating traits by skilled observers are we able at present to cover comprehensively the truly important aspects of behavior, as observed in actual social settings and over adequate samples of time. Pure rating observations, it is true, must in the end be regarded only as a builder's scaffolding, marking out the main patterns of personality in a preliminary fashion. The more exact structure of personality patterns will need to be established within this framework, with the slow growth of actual personality tests and measurements. But at present the assessments of trained judges constitute the best and most comprehensive source of data.

Our review of published (and some unpublished thesis material) research on personality clusters resulted in some 131 putative clusters being set out for comparison. Paired comparisons were made in every possible way and clusters showing considerable overlap were thrown together. In two extensive sets of cluster data, namely, those of the Harvard Psychological Clinic (10, 17) and those of the present writer (6), the classification of the clusters by inspection of their content could be checked upon by the results of further research showing the intercorrelations of the clusters themselves.

The classification and cataloguing of clusters could not be carried out with the certainty of a mechanical rule, however, because of the necessity of incorporating in the psychological judgment the following qualifying circumstances, and these should be kept in mind in appraising the results.

1. Different investigators have used different correlation standards for admission of traits to clusters. The variabilities are not great (0.4 to 0.6) and one may note that even if the same numerical standards had been adopted the situation would not be improved, for differing variabilities of groups, reliabilities of estimate etc. would normally cause one and the same cluster to have different mean intercorrelation in different researches. It seems better rather to aim at investigators getting about the same percentage of clustering traits.

2. Some have taken rather atypical groups, or groups limited in personality variety, e.g. graduate students or college faculties, and have thus found esoteric clusters not present in the general population, while missing more fundamental patterns of human nature. However, the striking thing in these instances is that the majority of clusters found are nevertheless the same.

3. The populations have been of very different ages. Ideally a presentation of empirical clusters would employ parallel charts, one for each age level, since it is likely on general clinical grounds that the form and constitution of clusters would change with age. Similar separations would need to be made with respect to population sampling by social class, intelligence etc. But such refinements are inappropriate to the scantiness of present data, and we aim first to establish the patterns which persist over most settings of human nature and most ages.

That clusters retain recognizable identity over critical age and sex transitions is shown by Tryon's observations (19) with boys and girls of different ages and by Sanford's and Horn's data (10, 17) on children and university students, as well as by the close similarity of many of Sanford's clusters for children and the present writer's clusters for mature adults. Tryon found the following type of cluster modification with age and sex.

| | *Boys 12 years* | *Boys 15 years* | *Boys 15 years* | *Girls 15 years* |
|---|---|---|---|---|
| Traits falling in cluster | Daring | Daring | Restless | Restless |
| | Leader | Leader | Talkative | Talkative |
| | Active in games | Active in games | Attention getting | Attention getting |
| | Friendly | Fights | | Bossy |
| | | | | Fights |
| | (Nuclear Cluster CB1–2 on chart) | | (Nuclear Cluster CA1 on chart) | |

4. Different trait lists (trait populations) have been used out of which to establish clusters. Clusters, or parts of clusters, are missing from some researches for no more mysterious reason than that no grist has been available for their making. Here too one meets the difficulties arising from the use of different but synonymous terms or of the same terms somewhat differently. For example, *Good Follower* in AA11 (McCloy) seems to be the same as *Loyal* in AA14 (Cattell), while *Leading* in CA53 (Cattell) becomes *Desire to Impose Will on Others* in CA51 (McCloy), *Need Dominance* in CA54 (Sanford-Murray) and *Leader* in CA52 (Williams). Two particularly ambiguous terms are aggressive (sometimes pugnacity, sometimes assertion) and sympathy (sometimes kindness, sometimes sensitive responsiveness).

This is the most serious and the least instructive of divergences in cluster definition. There is a need for more standardized, comprehensive trait lists and for definition of traits by bipolar opposite pairs of terms. Regarding the latter it is interesting to note that in cluster classification a syndrome which was not recognized in one form was often recognized easily in its obverse form, indicating the practical value of *bipolar definition*.

The trait population problem reaches its climax in dealing with those researches in which the investigator has been interested only in one pet cluster and has packed the original list with traits likely to fall in or near this cluster, while neglecting to take bearings on a sufficient number of other important points of the behavior compass.

For the above reasons it seems requisite to discuss briefly the solution adopted here in finally recording the agreed cluster nucleus traits. They have been uniformly translated into terms from the standard 171 item bipolar trait list prepared by condensation (6) from the list of all personality trait terms in the English language, which Allport and Odbert (2) have so skilfully garnered. These 171 terms offer a kind of 'Basic English' for personality research, for they can be shown to include all terms used in previous personality researches (or an effective synonym thereof) as well as able to represent the favored technical expressions of most special schools. A fuller discussion of this basic trait list is given at the head of the cluster chart.

By reason of the sources of variation just described phenomenal clusters in different researches which might otherwise have been identical showed certain divergences. These divergences could themselves be studied to throw light on the essential nature of the nuclear cluster, but at this stage we concentrated on discovering the nuclear cluster itself, putting together for this purpose all phenomenal clusters which had two or more traits in common, which had the same psychological character as wholes and which were known to correlate highly with one another. A *nuclear cluster* was then constructed and defined by the traits common to the phenomenal clusters. Although the temptation to record results most economically, by listing nuclear clusters only, is great, it has seemed best to make this review adequate and unbiassed by listing also the phenomenal clusters. Not only does this save the data from possible errors of interpretation but also it provides stimulus for studying the effect of sample on cluster form as well as material for building up more exhaustive lists of related traits as a basis for further research in the region concerned.

Although perhaps four-fifths of the phenomenal clusters converge naturally on certain nuclei, instances occur in which it is difficult to place a cluster bridging two nuclei, either because it is so broad as to include both or because the nuclei are indistinct and pass over without a break one into another. (Between B3 and B4, for example, it is difficult to draw a line.) Throughout, nuclei which resemble each other have been placed in immediate contiguity, so that revisions of boundaries may be readily made in the light of later research. Naturally, by lowering the standard of cluster intra-correlation, broader clusters can always be found to bridge even clearly distinct nuclei.

Just as phenomenal clusters merge in nuclear clusters so do the latter form natural groupings in what have been called *sectors*—to indicate their relation to the personality sphere concept, i.e., they are regions of the surface of the multidimensional personality sphere. The nuclear clusters and their fringes, however, only overlap slightly and in respect to the most general qualities, so that a nuclear cluster at one boundary of the sector may differ very distinctly from that at the opposite boundary. (This was discussed as a logical possibility, in relation to Diagram II.) Eighteen out of the twenty sectors were naturally bounded constellations of nuclear clusters, not so wide that any distinct difference of quality arose between the opposite boundary clusters of any one of them. But two regions, A and C, extended more than could be tolerated on logical grounds. The former, as indicated in another connection, began with character trustworthiness and finished with something nearer temperamental stability. The latter began with straight self assertiveness and ended with insecure self defensiveness

with distinct maladjustment. In these cases relatively faint natural dividing lines were found, so that the unduly large A sector was split into AA, AB and AC, and the C sector into sectors CA and CB partly on logical grounds. No data are available to indicate definitely the width of the typical sector, but from indirect evidence one may estimate that it is about 75°, corresponding to an r of about 0.26 between the least correlated nuclear clusters.

The scheme of representation and conceptualization at this stage has to be a fairly elastic one. The situation is remarkably similar to that faced by astronomers a generation ago in mapping stellar distributions. To maintain perspective, and to accommodate to peculiarities of the distribution are the major objectives. The notions of sector, cluster nucleus and phenomenal cluster seem to help approach these objectives. Naturally there will be big quantitative variations. Some sectors contain many nuclei, others, as yet, only one or two. In some, e.g., the F region, the nuclei are very closely packed, in others highly discrete and disparate.

The sectors, like the nuclei, have been arranged so that those with the closest resemblance are in immediate contiguity and labelled by consecutive letters of the alphabet. From the 'character' qualities of AA there is transition to the 'realism-emotional integration' of AB, thence to the 'balance-frankness-optimism' of AC and so, through the truly borderline cluster B1, to the purely intelligence-rooted qualities of B. (The frequency with which intelligence and character integration are found to correlate in general research would lead us to expect such a smooth bridge here.) Similarly the 'daring and social boldness' of CB pass, with a barely perceptible break in the cluster quality, into the pure 'sociability and friendliness' of D. A really clear continuity is indicated by a master letter spreading over the sectors concerned, as on AA, AB and AC.

It is noticeable that where sectors make contact (as by some cluster which could almost equally be in either) the transition cluster bridges not only in one direction but in several. Thus G1 (Austerity-Thoughtfulness-Stability) grades not only into AA1 (Self-control-Loyalty-Fairmindedness-Reliability) but also into B2 (Gentlemanly, Disciplined Thoughtfulness) and into E3 (Deliberateness-Seriousness-Reserve). Also there are linkages other than at the boundaries of sectors, breaking the apparent continuity of regions, notably through the obvious psychological cousinship of CA3 and F6, of CA1 and E1 and of AC2, D5 and F7. In short it is not possible, in other than a rough manner, to arrange sectors in a linear continuum or even in the richer relationships permitted by the two-dimensional continuum of the surface of a sphere. The nature and relationships of clusters are such that the nuclei can

only be represented in a multidimensional space, as the hypothesis of the trait sphere (6) has always required and as the findings of factor analysis (which deals with the same material as cluster studies) demonstrate.

## III. The Construction of a Chart of Personality Clusters

The exhaustive inter-comparison of 131 phenomenal clusters, as described above, led to the formation of 50 nuclear clusters, falling into 20 personality sectors, but with the majority falling in the first ten sectors. The roundness of these numbers is purely fortuitous and later research may modify the number of nuclear clusters if not the number of sectors.

The present aim has been not only to chart and systematize clusters but to make the classification such that it will form a convenient framework for the addition of fresh material and permit of continuous adaptive growth. A first requisite for this aim is that one avoid the prejudiced interpretation and classification which would come from affixing names, especially interpretive names, to the nuclei and sectors. As the ensuing discussion indicates, many of these clusters are clearly old friends from the clinic, the classroom, or the laboratory, such as the syndromes of paranoia, neuroticism, somatotonia, cyclothymia, extraversion, dominance, etc. The temptation to leap to an interpretive label of this kind is considerable, because it is briefer, more colorful and seemingly more technical than a collection of literal trait terms. But it is highly desirable to separate clearly the descriptive and the interpretative steps of personality research and the present project deals with the description of personality only. For, in the opinion of the writer, the too facile and premature interpretation which has prevailed in this field has aborted the enterprise of exact observation. It has left psychology with a set of popular syndrome concepts, such as extraversion, dominance, neuroticism and cyclothymia, so battered and warped by the superficial interpretations of the market place that they might as well be thrown away.

The general structure of cluster and sector is such that the notation which suggests itself as most practicable is something akin to the Dewey decimal system of library classification, fitted to permit constant growth. Instead of using numbers throughout, however, it seemed best to indicate the sector by a letter, since sectors, of which we probably already have most recorded, are not likely to extend beyond the alphabet. (Usually a single letter is used, but sectors within a major region are indicated by two, as in AA, AB and AC.) The nuclear cluster is identified by a number within a sector, thus, D1, D2, D3, etc., and the actual, historical, phenomenal clusters by an additional decimal point,

thus, D1.1, D1.2, etc., indicating the clusters converging on the nucleus D1. The order of these clusters within the nuclear group is a chance arrangement, there being no point, except perhaps historical order of discovery, in any other. Each phenomenal cluster is labelled further by the name of its discoverer, thus, *D5.1 Tryon.*, to facilitate reference to the original research and conditions of its isolation. The phenomenal clusters isolated by the present writer and published in a recent research, which are more numerous than others and need further identification, have in addition a number in brackets giving their index number in the list there published.

Each sector and cluster nucleus indexed in the manner just described is also defined by a triplet of terms aimed at maximum literal description of the behavior concerned in that region. Although the writer believes adjectival trait terms are better, these traits are given in noun form to follow general practice, which has favored hypostatizations. But the actual list of traits by which the nucleus is eventually anchored is set out in adjective form immediately below the title.

The terms in which this final nuclear definition of all traits that have appeared in the various phenomenal clusters is expressed are from the standard 'basic list' of 171 trait terms already described. The reasons for putting weight on this trait particular list and its constructs in our final summary, rather than on the trait material of other researches here listed, are as follows.

1. It covers all trait terms, including those in various specialized systems.
2. The terms are themselves standard dictionary terms, having widely understood meanings, widely stabilized in language.
3. There is a more considerable literature of clusters already in this trait system than in any other, and of clusters, moreover, with the following special utilities (a) they are based on a more typical, adult population than most, (b) they are unbiassed, being based on purely "blind" mathematical treatment of variables, (c) the structural relationships among the clusters are systematically known through further intercorrelation studies on clusters.
4. The traits are in terms of polar opposite pairs.

It is worthy of note, in regard to the utility of such a list, that the 69 clusters found by research on the 171 traits involved (6) cover decidedly more sectors of personality than are subtended by other cluster researches, and open up regions of type and syndrome description not previously suspected, actually increasing the number of sectors from 11 to 20. At the same time all of the older 11 sectors are confirmed, and indeed 28 of the original 31 nuclei within these sectors, based on all previous researches, are rediscovered in the one research on this wider trait foundation, while 19 new cluster nuclei are added. Considered theoretically, as well as in the light of these results, it is evident that the basing of the cluster spacing on the foundation of the personality

sphere trait list offers the chief guarantee that the cluster chart truly depicts the proportions and perspectives of "personality space."

To guide any preliminary interpretation that may be attempted regarding the developmental or other relationships between the actual phenomenal clusters of different researches, within the cluster nucleus, particulars of the research methods and population samples involved in the various researches are set out briefly.

*ACKERSON, L. (1). 1000 girls and 2000 boys, 6–16 yrs. Traits checked present or absent on basis of extensive clinical and social records.

CATTELL, R. B. (Temperament research (4)). 62 male college students. Rated by fellows in residence. 48 traits, mainly temperamental, some character.

CATTELL, R. B. (6). 100 mature adults, in varied occupations. Each rated by two associates. 171 traits, in comprehensive 'basic trait list.'

FLEMMING, E. G. (9). 71 high school girls, all, in some degree, leaders. Ratings by teachers and by coevals. 46 varied traits.

*JONES, E. S. (11). 145 men business executives and teachers. Rated by associates. Brief but comprehensive trait list.

MASLOW, A. H. (12, 13). 60 women college students. Rated at interview, after selection by questionnaire as to presence or absence of traits.

MAURER, K. M. (14). 50 children of 4–6 yrs. Traits checked present or absent by one judge (woman) to each child. Child chosen by judge. 50 traits, reduced from very wide dictionary list.

MCCLOY, C. H. (15). 31 college students. Rated by one another. 43 traits, largely characterial. Also re-analysed Webb's data on 200 students.

*OLINICK, S. L. (16). 60 adults, mainly professional class. Traits checked present or absent, by an intimate acquaintance of each. 173 traits, chosen from Allport-Odbert list.

SANFORD, R. N. (17). Labelled *Sanford-Murray* in chart, because Sanford established clusters in terms of Murray's trait list and concepts. 43 boys and girls, 5–14 years. Rated by adult judges, over period of three years. 45 traits, 34 of which were purely ergic in character.

SANFORD-HORN-MURRAY. In Horn D. (10). Extension of Sanford-Murray enquiry to college students, establishing four of Sanford's twenty clusters essentially in same terms for adults. 28 university students. Rated by several judges, in clinical study. 11 traits, from Sanford-Murray list.

SHELDON, W. (18). 33 students and faculty. Rated by one judge. 50 traits clinically sifted from 650 in temperament field. Repeated with 100 students, conditions of rating not stated, to fix intra-cluster relationship of variables.

TRYON, C. M. (19). 170 12 year old boys, 170 12 year old girls, 169 15 year old boys, 181 15 year old girls. Rated by class mates. 18 traits, of varied character.

WILLIAMS, H. M. (20). 53 three year old children. Rated by experienced adult judges. 30 traits, taken from Berne Scale.

* These three studies are not strictly cluster studies, but are included because the data have such special virtue that it was considered worth while to approximate to the clusters in it by rough manipulations of the given correlations, rather than discard the data. In each we are given a set of traits which correlate highly with one particular trait, without proof that they correlate highly among themselves. Ackerson's comprehensive work is particularly valuable because it deals with recorded behavior (according to clinic and police and social worker) of really adequate numbers of children and gives such extensive intercorrelation lists that the cluster formation can be almost completely determined.

## IV. Chart of Personality Clusters and Sectors

### *REGION A.*

### *CHARACTER-PERSONALITY INTEGRATION OR DEVELOPMENT*

v.

### *MORAL CHARACTER DEFECT, NEUROSIS, PSYCHOSIS*

#### 1. Sector AA. Fineness of Character

v.

#### Moral Defect, Non-Persistence

*Nuclear Cluster AA1.*

Integrity, Altruism

v.

Dishonesty, Undependability

*Nuclear Traits*

Honest—Dishonest
Self Controlled
Self Denying—Selfish
Loyal—Fickle
Fair-minded—Partial
Reliable—Undependable

*Overlapping phenomenal clusters in AA1.*

*AA11. McCloy*

Integrity (Having), Good Follower, Fair, Characterful, Self-Denying, Trustworthy. (And other traits described as "passive but constructive virtues.")

*AA12. Flemming*

Fair, Good Judgment, Honest, Idealistic, Intelligent, Understanding.

*AA13. Cattell* (39)

Stable Emotionally—Changeable
Thoughtful—Unreflective
Self-Respecting—
Self-Controlled—
Reliable—Undependable
—Suggestible
(Practical—Unrealistic)

*AA14. Cattell* (40)

Dishonest—Honest
Fickle—Loyal
Infantile—Mature

*Nuclear Cluster AA2.*

Conscientious Effort

v.

Quitting, Inconherence

*Nuclear Traits*

Persevering—Quitting
Pedantic (Orderly)—Disorderly
Painstaking—Slipshod
Conscientious—Conscienceless
Thoughtful—Unreflective

*Overlapping phenomenal clusters in AA2.*

*AA21. Cattell* (13)

Clear Thinking—Incoherent
Persevering—Quitting
Independent—Dependent
Painstaking—Slipshod
Conscientious—Conscienceless

*AA22. Sanford-Murray*

Need Blamavoidance, Need Order, Deliberation, Conjunctivity, Endurance, Need Achievement, Need Counteraction, Need Understanding, Need Construction. (Called "Conscientious Effort").

*AA23. Olinick*

Conscientious, Courteous, Neat, Thoughtful, Aggressive, Practical, Earnest.

*AA1–2. Flemming.*

This extends over AA1 and AA2.
Dependable, Industrious, Loyal, Modest, Neat, Sincere, Tolerant, Unselfish.

## 2. Sector AB. Realism, Emotional Integration v. Neuroticism, Evasion, Infantilism

*Nuclear Cluster AB1.*

Realism, Reliability
v.
Neuroticism, Changeability

*Nuclear Traits*

Practical—Unrealistic
Reliable—Undependable
—Neurotic
Placid—Worrying
Loyal—Fickle

*Overlapping phenomenal clusters in AB1.*

*AB11. Cattell* (21).

Practical—Unrealistic
Reliable—Undependable
—Neurotic
Self-Controlled—
Loyal—Fickle.

*AB12. Cattell* (53)

Unrealistic—Practical
Quitting—Persevering
Suggestible—
Undependable—Reliable
Subjective—Guided by Reality.

*AB13. Ackerson*

Overlaps also with AB2.
Sensitive, Worrisome, Depressed, Changeable, Finicky Food Habits, Lacking Initiative, Nervous Symptoms, Bossy, Inferiority Feelings, Spoiled Child.

*Nuclear Cluster AB2.*

Practicalness, Determination
v.
Daydreaming, Evasiveness

*Nuclear Traits*

—Self-Deceiving
Facing Life—Evasive
Decisive—Dubitative
Enterprising—Shiftless
Phantasying

*Overlapping phenomenal clusters in AB2.*

*AB21. Cattell* (12)

Self-Deceiving—
Evasive—Facing Life
Unrealistic—Practical
Dubitative—Decisive
Acquisitive—

*AB22. McCloy*

Aggressive, Initiative (Having), Conviction (Having), Decisiveness (Having).

*AB2–3.1 Ackerson*

A cluster overlapping AB2 and AB3.
Daydreaming, Masturbation, Depression, Fantastic Lying, "Queer" Behavior, Absent Minded, Irresponsible, Inferiority Feelings.

*Nuclear Cluster AB3.*

Neuroticism, Self-Deception, Emotional Intemperateness

v.

*Nuclear Traits*

Self-Deceiving—
Neurotic—
Hypochrondriacal—
Depressed—Cheerful
Emotionally Intemperated—Balanced
Absent Minded—Alert

*Nuclear Cluster AB4.*

Infantile, Demanding, Self-Centeredness

v.

Emotional Maturity, Frustration Tolerance

*Overlapping phenomenal clusters in AB3.*

*AB31. Cattell* (8)

Self-Deceiving—
Hypochondriacal—
Neurotic—
Plaintive—
Self-Pitying—
Extreme—Temperate
(Emotionally intemperate)

*Overlapping phenomenal clusters in AB4.*

*AB41. Cattell* (38)

Infantile—Mature (Emotionally)
Hypochondriacal—
Self-Pitying—
Exhibitionist—Self-Effacing.
Unself-Controlled—Self-Controlled

*AB–C.1 Ackerson's*

"Personality Total" extends through AB2, AB3, AB4, AC1 and AC2.
Incipient Psychosis, Defective Conduct Total, "Queer," Depressed, Contrary, Jealousy of Sibs, Worrisome, Inferiority Feelings, Etc.

3. SECTOR AC. BALANCE, FRANKNESS, OPTIMISM

v.

MELANCHOLY, AGITATION

*Nuclear Cluster AC1.*

Agitation, Melancholy, Obstinacy

v.

Placidity, Social Interest

*Nuclear Traits*

Depressed—Cheerful
Hypochrondriacal—
Worrying—Placid
Habit-Bound—Labile
Sensitive—Tough
Seclusive—Sociable

*Nuclear Cluster AC2.*

Balance, Frankness, Sportsmanship

v.

Pessimism, Secretiveness, Immoderateness

*Nuclear Traits*

Frank—Secretive
Generous—Tight-Fisted
Temperate—Emotionally Extreme (schizoid)
Easy Going—

*Overlapping phenomenal clusters in AC1.*

*AC11. Cattell* (56)

Self-Pitying—
Hypochondriacal—
Pessimistic—Optimistic
Worrying—Placid
(Habit-Bound—Labile)

*AC12. Ackerson*

Depressed, Crying, Sensitive and Worrisome, Psycho-neurotic, Daydreaming, Hatred, Jealousy of Sibling, Changeable Moods, Seclusive.

*Overlapping phenomenal clusters in AC2.*

*AC21. Cattell (Temperament Research)*

Emotionally Balanced, Temperate—Extreme
Frank—Secretive
Optimistic—Pessimistic
Generous—Tight-Fisted

*AC22. Flemming*

Frank, Generous, Good Natured, Good Sport, Natural, Unaffected.

## 4. Sector B. Intelligence, Disciplined Mind, Independence v. Foolish, Undependable Unreflectiveness

*Nuclear Cluster B1.*

Emotional Maturity, Clarity of Mind
v.
Infantilism, Dependence

*Nuclear Traits*

(As in B11 opposite)

*Overlapping phenomenal clusters in B1.*

*B11. Cattell* (6)

Mature—Infantile
Clear Thinking—Incoherent
Independent—Dependent
Spatial, Visual Thinking Ability —Neurotic
Reliable—Undependable

*Nuclear Cluster B2.*

Gentlemanly, Disciplined Thoughtfulness
v.
Extraverted, Foolish, Lack of Will

*Nuclear Traits*

Thoughtful—Unreflective
Wise—Foolish
Persevering—Quitting
Austere—Profligate
Polished—Rough

*Overlapping phenomenal clusters in B2.*

*B21. Sanford-Murray*

Need Counteraction, Endocathection. (Called "Counteractive Endocathection.")

*B22. Cattell* (5)

Thoughtful—Unreflective
Wise—Foolish
Austere—Profligate
Independent—Dependent
Polished—Rough
Reliable—Undependable

*B23. Cattell* (15)

Thoughtful—Unreflective
Theoretical Interests—
Logical Ability, Reasoning—
Planful—Planless
Wise—Foolish
—Suggestible

*B24. Cattell* (16)

Thoughtful—Unreflective
Polished—Rough
Analytical—
Interests Wide—Interests Narrow
Sophisticated—Simple-Hearted

*Nuclear Cluster B3.*

Creativity, Self-Determination, Intelligence
v.
Narrowness of Interests, Fogginess

*Nuclear Traits*

Original—Banal
Constructive—
Interests Wide—Interests Narrow
Independent—Dependent
Persevering—Quitting
Intelligent—

*Overlapping phenomenal clusters in B3.*

*B31. Cattell* (2)

Original—Banal
Interests Wide—Interests Narrow
Versatile—
Independent—Dependent
Constructive—
Intelligent

*B32. Sanford-Murray*

Creativity, Endurance, Need Counteraction, Need Order, Need Construction (Called "Orderly Production.")

*Nuclear Cluster B4.*

Intelligence, Penetration, General Talent
v.
Lack of 'g'

*Nuclear Traits*

As in B41.

*Overlapping phenomenal clusters in B4.*

*B41. Cattell* (3)

Intelligent, Clear Thinking, Logical Ability, Reasoning, Clever, Spatial-Visual Ability, Mathematical Ability, Analytical.

*B3–4.1. Flemming*

Cluster extending over B3 and B4.
Clever, Cultured, Original, Talented, Well Informed, Wide Interests.

## *REGION C.*

## *SELF-ASSERTION, VENTURESOMENESS, CLAMOROUSNESS*

v.

## *GENERAL INHIBITION, MODESTY, TIMIDITY*

### 5. Sector CA. Egotism, Assertion, Stubbornness

v.

### Modesty, Self-Effacement, Adaptability

*Nuclear Cluster CA1.*

Crude Social Assertion, Exhibitionism
v.
Modesty, Obedience to Authority

*Nuclear Traits*

Exhibitionist—Self-Effacing
Argumentative—
Talkative—Taciturn
Boastful—Modest
Arrogant—Humble

*Overlapping phenomenal clusters in CA1.*

*CA11. Tryon*

Restless, Talkative, Attention Getting (Bossy), (Fights), (Unkempt)

*CA12. Sanford-Murray*

Need Blamavoidance, Need Deference. (Called "Willing Obedience.")

*CA13. Cattell* (1)

Arrogant—Humble
Exhibitionist—Self-Effacing
Conceited—Self-Dissatisfied
Headstrong—Gentle Tempered
Argumentative—
Assertive—Submissive
Autocratic—
Boastful—Modest

*CA14. Cattell* (4)

Exhibitionist—Self-Effacing
Treacherous—
Extrapunitive—Praiseful
Talkative—Taciturn
Argumentative—
Boastful—Modest

*CA1–2.1. Maurer*

*Cluster overlapping CA1 and CA2 and some CA3*

Talkative, Domineering, High Strung, Forward, Active, Persistent, Obstinate, Noisy, Independent, Plucky

*Nuclear Cluster CA2.*

Stubborness, Pugnacity, Clamorousness
v.
Tolerance, Self-Effacement

*Nuclear Traits*

Extrapunitive—Praiseful
Pugnacious—Peaceable
Self-Pitying—
Mulish—Reasonable

*Overlapping phenomenal clusters in CA2.*

*CA21. Sanford-Murray*

Need Defendance, Need Rejection, Need Autonomy, Need Blamescape, Need Aggression, Need Retention, Need Acquisition, Need Dominance, Projectivity. (Called "Aggressive Self-Defence.")

*CA22. Cattell* (34)

Extra-punitive—Praiseful
Opinionated—Tolerant
Pugnacious—Peaceable
Self-Pitying—
Exhibitionist—Self-Effacing
Mulish—Reasonable

*Nuclear Cluster CA3.*

Rigidity, Despotism, Egotism
v.
Adaptability, Friendliness, Tactfulness

*Nuclear Traits*

Inflexible—Adaptable
Extrapunitive—Praiseful
Tactless—Tactful
Hostile—Friendly
Ruthless—Kind
Defensive—
Acquisitive—
(Infantile—Mature)

*Overlapping phenomenal clusters in CA3.*

*CA31. Cattell* (27)

Inflexible—Adaptable
Extrapunitive—Praiseful
Hostile—Friendly
Opinionated—Tolerant
Egotistic—Altocentric
Flattering

*CA32. Flemming*

Adaptable, Considerate, Not Easily Excited, Pleasant Voice, Sympathetic, Tactful.

*CA33. Cattell* (10)

Extrapunitive—Praiseful
Treacherous—
Acquisitive—
Thankless—Grateful
Defensive—

*CA34. Sanford-Murray*

Need Blamavoidance, Need Abasement. (Called "Guilt and Remorse.")

*CA35. Cattell* (Temperament Research)

Mature (Emotionally)—Infantile
Kind on Principle—
Good-Natured—
Tactful—Tactless

*Nuclear Cluster CA4.*

Shrewd, Dictatorialness
v.
Naive, Unassertiveness

*Nuclear Traits*

As in CA41 opposite.

*Overlapping phenomenal clusters in CA4.*

*CA41. Cattell* (47)

Autocratic—
Shrewd—Naive
Boastful—Modest
Assertive—Submissive
(Austere—Profligate)

*Nuclear Cluster CA5.*

Assertion, Rivalry, Conceit
v.
Modesty, Unassumingness

*Nuclear Traits*

Leading—
Conceited—Self-Dissatisfied
Assertive—Submissive
Autocratic—
Self-Confident—Self-Distrusting
Exhibitionist—Self-Effacing

*Overlapping phenomenal clusters in CA5.*

*CA51. McCloy*

Eagerness for admiration, Self-Esteem (Conceit), Desire to Impose Will on Others.

*CA52. Williams*

Ascendant, Rivalrous, Leader, Independent of Adults.

*CA53. Cattell* (32)

Conceited—Self-Dissatisfied
Leading—
Boastful—Modest
Self-Confident—Self-Distrusting
(Headstrong—Gentle-Tempered)
(Hurried—Lethargic)

*CA54. Sanford-Murray*

Need Dominance, Need Aggression, Need Acquisition, Need Autonomy, Need Recognition, Need Cognizance, Need Defendance, Need Exhibition, Need Excitance, Intensity. (Called "Ascendance.")

*Nuclear Cluster CA6.*

Eager, Self-Assertion
v.
Lack of Ambition

*Overlapping phenomenal clusters in CA6*

*CA61. Sanford-Murray*

(There are insufficient elements in this cluster to locate it with confidence. It seems most likely an appendage of the CA sector.) Need Achievement, Intensity. (Called "Undisciplined Achievement.")

## 6. Sector CB. Boldness, Independence, Toughness
v.
Timidity, Inhibition, Sensitivity

*Nuclear Cluster CB1.*

Energy, Boldness, Spiritedness
v.
Apathy, Timidity, Languor

*Nuclear Traits*

Energetic, Spirited—Languid
Enthusiastic—Apathetic
Alert—Absent-Minded
Debonnaire
(Strong Personality— )
(Quick—Slow)
(Bold—Timid)
(Independent—Dependent)

*Clusters extending over CB1 and CB2*

*Overlapping phenomenal clusters in CB1.*

*CB11. Cattell* (33)

Energetic Spirited—Languid
Self-Confident—Self-Distrusting
Enthusiastic—Apathetic
Independent—Dependent
(Physical Activity Interests)
(Debonnaire— )

*CB12. Sanford-Murray*

Need Passivity, Need Harmavoidance. (Called "Passive Timidity.")

*CB13. Cattell* (44)

Alert—Absent-Minded
Energetic, Spirited—Languid
Quick—Slow
Strong in Personality—

*CB14. Cattell* (28)

Energetic, Spirited—Languid
Vivacious—
Assertive—Submissive
Hearty—Quiet
Debonnaire—

*CB1–2.1. Sheldon (Somatotonia)*

Assertive, Dominating, Competitive, Energetic, Adventurous, Bold, Courageous, Not Sensitive, Unrestrained, Noisy, "General extravert qualities."

*CB1–2.2. Tryon*

Daring, Leader, Active in Games (Friendly), (Fights), (Humor about jokes).

*CB1–2.3. Olinick*

Independent, Proud, Active, Sociable, Leader, Adventurous

*Nuclear Cluster CB2.*

Independence, Cleverness, Confidence
v.
Timidity, Dependence, Languidness

*Nuclear Traits*

Independent—Dependent
Clever—
Versatile (Technical aptitudes)
Self-Confident—Self-Distrusting
Alert—Absent-Minded
Energetic, Spirited—Languid

*Overlapping phenomenal clusters in CB2.*

*CB21. Cattell* (26)

Independent—Dependent
Technical Interests—
Mechanical Aptitude—
Versatile—
Self-Confident—Self-Distrusting

*CB22. Sanford-Murray*

Need Succorance, Need Harmavoidance, Projectivity. (Called "Timid Dependence.")

*CB23. Cattell* (43)

(*Bridges clusters CB1 and CB2*)

Independent—Dependent
Clever—
Alert—Absent-minded
Energetic Spirited—Languid
(Adventurous—Timid)
(Quick—Slow)

*Nuclear Cluster CB3.*

Lack of Restraint, Adventurousness
v.
General Inhibition, Fearfulness

*Nuclear Traits*

Timid—Bold
Shiftless—Enterprising
Submissive—Assertive
Worrying—Placid
Shy—Sociable I (Forward)
Inhibited—Incontinent

*Overlapping phenomenal clusters in CB3.*

*CB31. Ackerson*

Bashful, Apprehensive, Lack of Initiative, Seclusive, Inferiority Feelings, Follower, Irregular Sleep, Listless, Sensitive and Worrisome

*CB32. Sanford-Murray*

Need Infavoidance, Need Harmavoidance, Anxiety. (Called "Timid Withdrawal.")

*CB33, Cattell* (46)

Inhibited (in general)—Incontinent
Timid—Adventurous
—Gluttonous
Submissive—Assertive
(Unenquiring—Curious)

*Nuclear Cluster CB4.*

Poised Sociability, Inertia, Toughness

v.

Introspectiveness, Sensitivity, Haste

*Nuclear Traits*

Tough—Sensitive
Lethargic—Hurried
Poised—Awkward
—Introspective
Sociable—Shy
Relaxed—High Strung
(Slow—Quick)
(Easy going—Short tempered)
(Clear thinking—Incoherent)

*Overlapping phenomenal clusters in CB4.*

*CB41. Sheldon* (Cerebrotonia)

Mental Overintensity, Fast Reactions, Inhibited, Shy, Not Sociable, Poor Sleep, Not habit-bound, Sensitive, "General introvert qualities."

*CB42. McCloy*

Cool-Headed, Resourceful, Poised, Self-Controlled, Sociable

*CB43. Cattell* (60)

Introspective—
Sensitive—Tough
Hurried—Lethargic
(Cautious—Bold)
(Taciturn—Talkative)

*Ill-defined Clusters in this sector.*

*CB1–3–4.1. Maslow* (Dominance)

A cluster covering most of CB sector, but principally Sector CB3 and CB4. Admixture of traits from A.

Self-Confident, Self-Assured, Socially Poised, Leader, Relaxed, Extroverted, Hypnotizable, High Self-Esteem, Tendency to Use People, Freer Personal Expression, Love of Adventure, and Novelty, Shy and Quiet, Embarrassable, Self-Conscious, Inhibited, Envious, Distrustful, Conventional, Modest, Honest and Reliable, Neat and Prompt, Faithful, Conservative, More Religious, More Polite

*CB1–2–4. D.1. Jones, E*

A cluster running on into the D sector.

Sympathetic Appreciation of Others' Difficulties, Confidence in Bearing, Cheerful and Optimistic, Energetic, Good Mixer, Clever in Repartee, Fluent.

*Nuclear Cluster CB5.*

Smartness, Assertiveness, Independence

v.

Unsophistication, Submissiveness, Reverence

*Nuclear Traits*

As in CB51, opposite.

*Overlapping phenomenal cluster in CB5.*

*CB51. Cattell* (41)

Sophisticated—Simple-Hearted
Independent—Dependent
Intelligent—
Assertive—Submissive
(Impious—Reverent)

## 7. Sector D. Sociability v. Timidity, Hostility, Gloominess

*Nuclear Cluster D1.*

Sociability, Adventurousness, Heartiness
v.
Shyness, Timidity, Reserve

*Nuclear Traits*

Sociable (Forward)—Shy
Sociable (Gregarious), II—Seclusive
Adventurous—Timid
Social Interests—
Intrusive—Reserved

*Overlapping phenomenal clusters in D1.*

*D11. Cattell* (49)

Social Interests—
Sociable, I—Shy
Curious—Unenquiring
Adventurous—Timid
Intrusive—Reserved

*D12. Olinick*

Extends beyond this nuclear region, e.g. into CB1
Sociable, Sympathetic, Active, Independent, Economical, Witty, Adventurous

*D13. Cattell* (51)

Sociable, I—Shy
Responsive—Aloof
Social Interests—
Sociable, II—Seclusive
Hearty—Quiet
(Intrusive—Reserved)

*Nuclear Cluster D2.*

Sociability, Sentimentalism, Warmth
v.
Independence, Hostility, Aloofness

*Nuclear Traits*

Responsive—Aloof
Affectionate—Frigid
Sentimental—Hard headed
Social Interests—
Home and Family Interests
Dependent—Independent
Friendly—Hostile
Frank—Secretive
(Genial—Cold-Hearted)
(Tough—Sensitive)

*Overlapping phenomenal clusters in D2.*

*D21. Cattell* (45)

Responsive—Aloof
Sentimental—Hard-Headed
Affectionate—Frigid
Genial—Cold-Hearted
—Sour

*D22. Olinick*

Sensitive, Sincere, Aloof, Independent, Domestic, Critical.

*D23. Sheldon*

(Viscerotonia)
Love of Comfort, Relaxed, Slow, Gregarious, Needing Sympathy, Easily Expressed Feelings, Even Tempered, Amiable, Social, Personality Interests

*D24. Cattell* (29)

Secretive—Frank
Aloof—Responsive
Sadistic—
Formal—Casual

*D25. Cattell* (30)

—Social Interests
Sour—
Slanderous—
Brooding—Unrepining
Aloof—Responsive

*D26. Sanford-Murray*

Need Affiliation, Need Nurturance, Need Deference. (Called "Social Feeling.")

*Nuclear Cluster D3.*

Interest in Group Life, Liking to Participate

v.

Self-Sufficiency

*Nuclear Traits*

Sociable, II—Seclusive
Cooperative—Obstructive
Responsive—Aloof
Dependent—Independent

*Overlapping phenomenal clusters in D3.*

*D31. Sanford-Murray*

Need Rejection, Need Seclusion, Need Retention. (Called "Self Sufficiency.")

*D32. Willioms*

Participating, Cooperative, Interested in Group.

*Nuclear Cluster D4.*

Personal Attractiveness, Sociability, Pleasure Seeking, Frivolity

v.

Earnestness, Asceticism, Mirthlessness

*Nuclear Traits*

(Attractive Personal Appearance)
(Popular—Unpopular)
Cheerful—Gloomy
Sociable—Seclusive
Laughterful—Mirthless
Mischievous (Playful)—
Sensuous—Ascetic
Frivolous—Serious
(Physical Activity Interests)

*Overlapping phenomenal clusters in D4.*

*D41. McCloy*

Cheerful, Fond of Large Gatherings, Concentrating on Pleasure

*D42. Tryon*

Popular, Good looking, Friendly, (Enthusiastic) (Humor)

*D43. Flemming*

Athletic, Good Personal Appearance, Beautiful, Smiling, Sociable.

*D44. Sanford-Murray*

Need Sociability, Need Play. (Called "Good Fellowship.")

*D45. Cattell (Temperament research)*

(Surgency—Desurgency)
Cheerful—Gloomy
Natural—Formal
Sociable—Unsociable
Humorous—Earnest
Adaptable—Conservative

*Broad Cluster.*

*D1–2–3–4–5. Maurer**

(Extending over all nuclei of D)
Sociable, Cheerful, Amenable, Responsive, Resourceful, Enthusiastic, Curious, Happy, Frank

*Nuclear Cluster D5.*

Cheerful Enthusiastic, Witty

v.

Cold-Hearted, Sour, Mirthless

*Overlapping phenomenal clusters in D5.*

*D51. Tryon*

Enthusiastic, Happy, Humor about Jokes, (Humor about Self)

* Note D4 and D5 cannot be fused, for in Tryon's data and again in Cattell's data both clusters appear from the same population of traits. Also, sociability is absent from D5.

*Nuclear Traits*

Cheerful—Gloomy
Enthusiastic—Apathetic
Optimistic—Pessimistic
Laughterful—Mirthless
Witty, Humorous—

*D52. Cattell* (19)

Genial—Cold-Hearted
Cheerful—Gloomy
—Sour
Optimistic—Pessimistic
Enthusiastic—Apathetic
Laughterful—Mirthless

## 8. Sector E. General Emotionality, High-Strungness, Instability v. Placidity, Deliberateness, Reserve

*Nuclear Cluster E1.*

High Strungness, Impulsiveness, Anxiety
v.
Apathy, Relaxation, Deliberateness

*Nuclear Traits*

High Strung—Relaxed
Impulsive—Deliberate
Hurried—Lethargic
Emotional—Unemotional
(Worrying—Placid)
(Excitable—Phlegmatic)
(Vivacious— )

*Overlapping phenomenal clusters in E1.*

*E11. Cattell* (22)

Excitable—Phlegmatic
Highly Strung—Relaxed
Hearty—Quiet
Hurried—Lethargic
Impulsive—Deliberate
Vivacious—

*E12. Cattell* (52)

Highly Strung—Relaxed
Hurried—Lethargic
Sleeps Poorly—Sleeps Well
Impulsive—Deliberate
Irritable—Good Tempered

*E13. Sanford-Horn-Murray*

Impulsivity—Deliberateness
Projectivity—Objectivity
Emotionality—Placidity
Intensity—Apathy
Disjunctivity—Conjunctivity
High Anxiety—Low Anxiety
Transience—Endurance
(Intraception—Extraception)
(Called "Anxious Emotional Expressiveness.")

*Nuclear Cluster E2*

Sthenic Emotionality, Hypomania, Instability
v.
Self-Control, Patience, Phlegm

*Nuclear Traits*

Emotional—Unemotional
(Hearty—Quiet)
Impulsive—Deliberate
Irritable—Good-Tempered
Unself-controlled—Self-Controlled
(Impatient—Patient)

*Overlapping phenomenal clusters in E2.*

*E21. Cattell* (37)

Emotional—Unemotional
Impulsive—Deliberate
Excitable—Phlegmatic
Impatient—Patient
—Self-Controlled
(Irritable—Good-Tempered)
(Emotional II. (Sthenic Emotionality)— )

*E22. Acherson*

Emotionally Unstable, Moody, Temper Tantrums, Violence, Nervous Symptoms, "Queer" Staying Out Late Nights, Object of Teasing, Neurological Defect, Encephalitis

*Nuclear Cluster E3.*

Intrusiveness, Frivolity, Neurotic Instability
v.
Deliberateness, Seriousness, Reserve

*Nuclear Traits*

As in E31, opposite.

*Overlapping phenomenal clusters in E3.*

*E31. Cattell* (20)

Intrusive—Reserved
—Self-Controlled
Impulsive—Deliberate
Frivolous—Serious
Neurotic—
(Self-Pitying— )
(Changeable—Stable Emotionally)

*Nuclear Cluster E4.*

Generally Emotional, Dissatisfied, Intense
v.
Content, Placid, Temperate

*Nuclear Traits*

Emotional—Unemotional
Impulsive—Deliberate
Extreme—Temperate
Dissatisfied—Contented
(Enthusiastic (ardent)—Apathetic)

*Overlapping phenomenal clusters in E4.*

*E41. Sanford-Murray*

Need Exhibition, Need Excitance, Need Cognizance, Need Recognition, Need Sex, Need Succorance, Need Exposition, Need Blamescape, Need Defendance, Projectivity, Impulsivity, Emotionality, Change (Called "Sensation!")

*E42. Sanford-Horn-Murray*

(Impulsivity—Deliberateness)
Change—Sameness
Emotionality—Placidity
Intensity—Apathy
( —Need Passivity)
(Called "Placid Immobility.")

*E43. Cattell* (25)

Extreme—Temperate
Emotional—Unemotional
Dissatisfied—Contented
Alcoholic—
Self-Deceiving—

## 9. Sector F. Gratefulness, Friendliness, Idealism
v.
Sadism, Slanderousness, Suspiciousness
(Benign Cyclothyme v. Hostile Schizothyme)

*Nuclear Cluster F1.*

Gratefulness, Easygoingness, Geniality
v.
Hardness, Vindictiveness. Cold-Heartedness

*Nuclear Traits*

As in F11 opposite.

*Overlapping phenomenal clusters in F1.*

*F11. Cattell* (11)

Grateful—Thankless
—Slanderous
Soft-Hearted—Hard-Hearted
Unresentful—Vindictive
Easy-Going—Short-Tempered
—Sour
Genial—Cold-Hearted

*Nuclear Cluster F2.*

Gratefulness, Kindness, Christian Idealism
v.
Hostility, Cynicism, Selfish Withdrawal

*Nuclear Traits*

Grateful—Thankless
Idealistic—Cynical
Self-Denying—Selfish
Friendly—Hostile

*Overlapping phenomenal clusters in F2.*

*F2.1 Cattell* (54)

Grateful—Thankless
—Sadistic
Self-denying—Selfish
Kind on Principle—
Unresentful—Vindictive
(—Self-Pitying)

*F22. Cattell* (14)

Grateful—Thankless
Curious—Unenquiring
Friendly—Hostile
Soft-Hearted—Hard-Hearted
Idealistic—Cynical

*F2–3.1. Cattell* (9)

(Perfect overlap of F2 and F3)
Grateful—Thankless
—Treacherous
Kind—Ruthless
Friendly—Hostile
Soft-Hearted—Hard-Hearted
—Jealous
Generous—Tight-Fisted
—Slanderous

*Nuclear Cluster F3.*

Friendliness, Generosity, Cooperativeness
v.
Hostility, Meanness, Obstructiveness

*Nuclear Traits*

Friendly—Hostile
Generous—Tight-fisted
Cooperative—Obstructive
—Phobic

*Overlapping phenomenal clusters in F3.*

*F31. Cattell* (24)

—Agorophobic
Friendly—Hostile
Generous—Tight-Fisted
—Jealous
Cooperative—Obstructive

*Nuclear Cluster F4.*

Cynicism, Suspicion, Dishonesty
v.
Idealism, Trustfulness, Respecting Self and Others

*Nuclear Traits*

As in F41 opposite

*Overlapping phenomenal clusters in F4.*

*F41. Cattell* (50)

Cynical—Idealistic
Suspicious—Trustful
Dishonest—Honest
Slanderous—Praiseful
—Self-Respecting

*Nuclear Cluster F5.*

Obstructionism, Cynicism, Unstable Hostility

v.

Idealism, Affection, Sensitive Consideration

*Nuclear Traits*

Obstructive—Cooperative
Cynical—Idealistic
Ruthless—Kind
Headstrong—Gentle
(Self-Distrusting—Self-Confident)

*Overlapping phenomenal clusters in F5.*

*F51. Cattell* (18)

Obstructive—Cooperative
Cynical—Idealistic
Extrapunitive—
Hostile—Friendly
Self-Distrusting—Self-Confident
(Headstrong—Gentle-Tempered)
(Habit-Bound—Labile)

*F52. Cattell* (62)

Idealistic—Cynical
Gentle-Tempered—Headstrong
Home and Family Interests—

*F5–6.1. Williams*

A cluster subtending F5 and F6, and possibly some of Sector A.
Affectionate, Polite, Sympathetic, Socially Controlled, Sensitive.

*Nuclear Cluster F6.*

Benign Emotional Maturity

v.

Slanderous, Jealous, Self-Pitying Infantilism

*Nuclear Traits*

Jealous—
Slanderous—Praiseful
—Kind on Principle
Infantile—Mature

*Overlapping phenomenal clusters in F6.*

*F61. Cattell* (17)

Jealous—
Thankless—Grateful
Slanderous—Praiseful
Treacherous—
Self-Pitying—
Infantile—Mature

*Nuclear Cluster F7.*

(Paranoid schizoid

v.

Trusting cyclothme.)

Sadistic, Vindictiveness, Suspicion,

v.

Good Temper, Unresentfulness, Complaisance

*Nuclear Traits*

Sadistic—
Sarcastic—
Vindictive—Unresentful
Suspicious—Trustful
Shrewd—Naive

*Overlapping phenomenal clusters in F7.*

*F71. Cattell* (35)

Sarcastic—
Sadistic—
Vindictive—Unresentful
Irritable—Good Tempered
Suspicious—Trustful

*F72. Cattell* (55)

Sadistic—
Lethargic—Hurried
Shrewd—Naive
Sarcastic—
Vindictive—Unresentful

## 10. Sector G. Liveliness, Instability, Verbal Expressiveness v. Reserve, Quiescence, Naturalness

*Nuclear Cluster G1.*

Austerity, Thoughtfulness, Stability
v.
Playfulness, Changeability, Foolishness

*Nuclear Traits*

Austere—Profligate
Thoughtful—Unreflective
Deliberate—Impulsive
—Mischievous
Stable Emotionally—Changeable
Reserved—Intrusive
(Serious—Frivolous)
(Cautious—Reckless)

*Overlapping phenomenal clusters in G1.*

*G11. Sanford-Murray*

Need Play, Need Exposition, Impulsivity, Change. (Called "Lively Self-Expression.")

*G12. Maurer*

Grave, Meditative, Cautious, Careful.

*G13. Cattell* (7)

Austere—Profligate
Wise—Foolish
Deliberate—Impulsive
Thoughtful—Unreflective
Reserved—Intrusive
Stable Emotionally—Changeable
Serious—Frivolous

*Nuclear Cluster G2.*

Verbal Skill, Interesting Ideas, Inquisitive
v.
Narrow Interests, Absence of Flattery

*Nuclear Traits*

As in G21, opposite.

*Overlapping phenomenal clusters in G2.*

*G21. Cattell* (42)

Verbal Aptitude—
Curious—Unenquiring
Interests Wide—Interests Narrow
Flattering—

*Nuclear Cluster G3.*

Eloquence, Affectedness, Amusing Conversationalism
v.
Self-Effacement, Inarticulateness, Naturalness

*Nuclear Traits*

Exhibitionist—Self-Effacing
Eloquent—Inarticulate
Original—Banal
Affected—Natural
Debonnaire—
Flattering—

*Overlapping phenomenal clusters in G3.*

*G31.* Flemming*

Amusing, Entertaining, Interesting in Conversation

*G32. Cattell* (31)

Eloquent—Inarticulate
Exhibitionist—Self-Effacing
Treacherous—
Flattering—
Imitative—

*G33. Cattell* (23)

Affected—Natural
Exhibitionist—Self-Effacing
Talkative—Taciturn
Debonnaire—

* Some interpretation of G31 is involved, since it is in terms of effects on the observers rather than in traits.

*Nuclear Cluster G4.*

Creativity, Wit, Emotional Color
v.
Dullness, Banality, Stability

*Nuclear Traits*

Original—Banal
Clever—
Witty—
Constructive—
Enterprising—Shiftless
Vivacious
Talkative—Taciturn
(Changeable—Stable Emotionally)
(Curious—Unenquiring)

*Overlapping phenomenal clusters in G4.*

*G41. Sanford-Murray*

Creativity, Need Understanding, Need Exposition, Change, Intensity. (Called "Colorful, Intelligent, Self-Expression.")

*G42. Flemming*

Competent, Has Individuality, Lively, Sense of Humor, Witty

*G43. Cattell* (64)

Enterprising—Shiftless
Original—Banal
Witty—

11. Sector H. Imaginative Intuition, Curiosity, Carelessness
v.
Thrift, Inflexible Habits, Smugness

*Nuclear Cluster H1.*

Thrift, Tidiness, Obstinacy
v.
Lability, Curiosity, Intuition

*Nuclear Traits*

Habit-Bound—Labile
Thrifty—Careless
Logical—Intuitive
Pedantic—Disorderly

*Overlapping phenomenal clusters in H1.*

*H11. Olinick*

Obstinate, Thrifty, Tidy (Exact).

*H12. Cattell* (61)

Habit Bound—Labile
Logical—Intuitive
Thrifty—Careless over Property
(Unenquiring—Curious)

*Nuclear Cluster H2.*

Creativity, Curiosity, Intuition
v.
Stability, Insensitiveness

*Nuclear Traits*

Constructive—
Curious—Unenquiring
Introspective—
Intuitive—Logical
Changeable—Emotionally Stable

*Overlapping phenomenal clusters in H2.*

*H21. Sanford-Murray*

Creativity, Need Sentience, Need Understanding, Endocathection, Intraception, Change. (Called "Sensitive Imaginative Creation.")

12. Sector I. Bohemian, Disorderly

v.

Persevering, Pedantic

*Nuclear Cluster I.1.*

Profligacy, Planlessness, Friendliness

v.

Austerity, Hostility, Perseverance

*Nuclear Traits*

As in I11. opposite.

*Overlapping phenomenal clusters in I1.*

*I11. Cattell* (48)

Profligate—Austere
Disorderly—Pedantic
Planless—Planful
Friendly—Hostile
(Quitting—Persevering)

13. Sector J. Aesthetic Interests, Thoughtfulness, Constructiveness

*Nuclear Cluster J1.*

General Aesthetic Interests, Thoughtfulness, Constructiveness

*Nuclear Traits*

General Aesthetic Interests—
Musical Ability—
Thoughtful—Unreflective
Constructive—

*Overlapping phenomenal clusters in J1.*

*J11. Cattell* (36)

Artistic Interest—
General Aesthetic Interests—
Thoughtful—Unreflective
Constructive—
Musical Ability—
(Ambitious—Unambitious)

*J12. Cattell* (63)

Musical Ability—
General Aesthetic Interests—
Musical Interests—

14. Sector K. Physical Strength, Endurance and Courage

v.

Physical Inactivity, Avoidance of Danger

*Nuclear Cluster K1.*

Title as above,
Traits opposite in K11

*Overlapping phenomenal clusters in K1.*

*K11. Cattell* (57)

Physical Strength and Endurance—Claustrophobic
Courageous—Cowardly
(Physical Activity Interests— )
(Physically Energetic and Active— )

15. Sector L. Amorousness, Playfulness

v.

Propriety

*Nuclear Cluster L1.*

Title as above

*Nuclear Traits*

As in L11, opposite.

*Overlapping phenomenal clusters in L1.*

*L11. Cattell* (58)

Amorous—Lustless
Eccentric—
Mischievous—

16. SECTOR M. ALCOHOLISM, REBELLIOUSNESS, CARELESSNESS

v.

PIETY, REVERENCE, THRIFT

*Nuclear Cluster M1.*

Title as above.

*Nuclear Traits*

As in M11, opposite.

*Overlapping phenomenal clusters in M1.*

*M11. Cattell* (59)

Alcoholic—
Worldly—Pious
Rebellious—Reverent
(Selfish—Self-Denying)
(Careless with Property—Thrifty)

17. SECTOR N. CURIOSITY, WIDE INTERESTS

v.

LIMITED INTERESTS

*Nuclear Cluster N1.*

Title as above

*Nuclear Traits*

As in N11, opposite.

*Overlapping phenomenal clusters in N1.*

*N11. Cattell* (65)

Curious—Unenquiring
Wide Interests—Narrow Interests
Political, National Interests—

18. SECTOR O. HYPOCHONDRIACAL, TACITURN RETROVERSION

v.

ELOQUENCE, INTEREST IN FUTURE

*Nuclear Cluster O1.*

Title as above.

*Nuclear Traits*

As in O11, opposite.

*Overlapping phenomenal clusters in O1.*

*O11. Cattell* (66)

Antevert—Retrovert
Eloquent—Inarticulate
—Hypochondriacal

19. SECTOR P. ASCETICISM, ECCENTRICITY

v.

COMFORT-LOVING CONVENTIONALITY

*Nuclear Cluster P1.*

Title as above

*Nuclear Traits*

As in P11, opposite.

*Overlapping phenomenal clusters in P1.*

*P11. Cattell* (68)

Ascetic—Sensuous, Comfort Seeking.
Individualistic—Conventional
Eccentric—
( —Plaintive)

20. SECTOR Q. INFLEXIBILITY, WANDERING

v.

ADAPTABLENESS, EASE OF SETTLING DOWN

*Nuclear Cluster Q1.*

Title as above

*Nuclear Traits*

As in Q11, opposite.

*Overlapping phenomenal clusters in Q1.*

*Q11. Cattell* (69)

Inflexible—Adaptable
Wandering—Settling Down

## V. Review

A survey of 131 *phenomenal clusters*, established in 14 independent researches, has shown that they fall, with little ambiguity, into 50 *nuclear clusters*, gathered in 20 topologically and psychologically distinct regions or *sectors* on what has been called (6) the *personality sphere*. In a minority of instances the boundaries do not prove to be sharp, and a few clusters, not established with sufficiently rigorous criteria, sprawl over two or three nuclei.

In closing it is relevant to point the possibilities by some entirely free speculation. Once the data are preserved in the above index system against the sclerosis of premature verbal coinage and the insidious assault of implicit interpretation, freer discussion may safely be indulged in 'out of court.' One can note that a majority of the clusters established by correlation procedures seem to be actually well known syndromes of the clinic and the laboratory. AB3 appears to be the syndrome of general neuroticism pursued in questionnaires; AB4 the clinical picture of conversion hysteria, AA1 the psychopathic personality, AC1 constitutional, agitated melancholia, and E1 and E2 two varieties of hypomania.

The schizoid pattern appears to be actually split up into several facets. F4 and F7 are clearly two developments of paranoid personality; AB1–2, AC2 and E3 indicate the pre-psychotic personalities respectively of simple, catatonic and hebephrenic schizophrenics; P1 suggests the hermit-eccentric schizothyme and Q1 presents a glimpse (a pattern fragment, albeit a nuclear fragment) of the ambulatory schizothyme.

Experiment and test results also link up with these clusters. B4 offers the main manifestations of Spearman's general ability factor, the personality associates of which ramify throughout the B sector. Spranger's aesthetic type, as measured by the Allport-Vernon Study of Values, seems to have the pattern of J1. The fairly remote divergence of F6 and B1 may indicate that Willoughby's 'Measure of Emotional Maturity' should be oriented to two measurements while the six nuclei found in the CA sector suggest a revision along similar lines, of Allport's Ascendance-Submission measure. The vague entity measured by many extraversion scales is perhaps the whole of sector D, with its five distinct patterns. Thurstone's antevert-retrovert measure is given new content (hypochondria with retroversion) by O1. The concept of 'general inhibition' of personality, suggested alike by animal studies and philosophical generalizations, is given form by CB3, but the similarly founded notion of 'dominance' does not receive support as constituting a useful single pattern.

Physiological-constitutional unities also appear, as in E4, which is clearly Burt's 'general emotionality' syndrome (3), CB1–2 which is Sheldon's 'somatotonia' and CB4 which suggests a 'hyperthyroid hypersensitivity' syndrome.

The subtler adjustments which escape typology but not the psychologist in the consulting room are also represented, and there are, further, patterns which suggest that correlation technique is capable of revealing less crude syndromes than those required to arrest clinical attention. F3 seems a central variety of obsessional-compulsive personality; CA1 presents the standard description of inferiority overcompensation; while H1 is clearly the character neurosis of the anal erotic character.

That correlation cluster analysis is capable of yielding, without any conspicuous absentees, the principal syndromes known to the clinical-experiential approach, but in more exact form, is highly encouraging. Now that perspective is attained research is ready, through inspection of the phenomenal clusters in any one of these nuclear syndromes and through the trial of further variables, to fill out completely the set of trait variables rightly belonging in any one

nucleus and to seek the causes of variation of phenomenal clusters. It is of great interest to compare the cluster structure also with that obtained in animal studies; also to augment and gradually transform the clusters found for human beings by adding test variables among the ratings. Above all, the stage is set, through the surer grasp granted by this precise description, for more exact studies than have hitherto been possible regarding nature-nurture and developmental problems of personality.

Nevertheless, the greatest interest attaches, not to the establishing of long suspected syndromes, but to the discovery of many patterns hitherto unobserved, each of which, when confirmed, could be the starting point of a whole realm of personality research.

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# SYMPTOM AND SYNDROME STATISTICALLY INTERPRETED

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Clinical literature, explicitly or by implication, attaches greater significance to a concurrence of symptoms than to the existence of any one of the symptoms taken singly. Consideration of the possible reasons for such a belief entails an examination of the concepts symptom, syndrome, diagnosis, and causality. The result is that these concepts are best defined in statistical terms.

## The Meaning of Symptom

A symptom is an aspect of behavior. If we are concerned with physiological behavior, such as the functioning of the heart, we may note valve sounds, rate of the beat, or regularity of the beat. Each of these aspects of function may be considered a symptom. When observing molar or psychological behavior, for example, an individual in conversation, we may observe tone of voice, gestures, or flushing of the face. Each of these likewise may be thought of as a symptom. Psychologists often take into account implicit symptoms, as in the study of emotion, but since the clinician deals with overt behavior and verbal reports of subjective states, it is these kinds of symptoms which will concern us here.

In the practice of medicine, the detection of irregularities in the composition of body fluids and similar discoveries are referred to as being symptomatic. Likewise in psychological counseling, letters, drawings, or other products of an individual are sometimes thought of as symptomatic. In both of these cases, that which is symptomatic is the product of a manner of functioning, and it is the manner of functioning with which we are really concerned.

Unfortunately symptom is usually thought of as referring to maladjusted behavior (**26, 30**). However, Warren (**26**), in a second definition, extends the concept to include any phenomenon, not necessarily related to disease or maladjustment. This latter point of view is much to be preferred since it helps overcome the belief that mental disease and maladjustment are special manifestations, related to general psychology by courtesy only. A frown may be a symptom of concentration just as much as a tic may be a symptom of neurosis.

Warren's definition also emphasizes that a symptom points to the presence of an otherwise unsuspected condition or state. We recognize

* I am indebted to my colleague, Henry A. Poppen, for many valuable suggestions, but take full responsibility for the ideas developed herein.

that any manner of functioning must be the consequence of something else. We have said that an aspect of behavior *may* be thought of as a symptom because it is customary to speak of phenomena as symptoms only if we feel that they need explanation. Too often, as Guthrie has pointed out, we feel called upon to explain only that behavior which differs from our own; ours is natural and lawful.

When a phenomenon is thought to need explanation it is common to refer to it as abnormal. Originally this meant more than just unusual; it meant nonlawful. Vestiges of belief in nonlawful symptoms are still encountered. However, if we expect an explanation of symptoms we are in effect tacitly admitting a lawfulness to their occurrence. It is the explanation of symptoms to which we shall now turn.

## Symptoms Related to Syndromes

Cohen and Nagel (10, pp. 245–247) discuss ways in which we try to order the phenomena of the natural world and thus explain them. There are two ways which are especially applicable in this discussion. First, we classify phenomena as things or entities which have an invariant conjunction of properties or characteristics. It is this sort of ordering or explanation which is involved in organizing symptoms into syndromes, if and when this can be done. A second kind of explanation is the establishment of causal relations. In this case we likewise search for invariant relations, though here they are between antecedents and consequents. These two types of order or explanation will be considered in turn.

Abstraction and generalization from experience, controlled or uncontrolled, give rise to concepts, things, or entities. The concept is an invariant conjunction of properties or characteristics. Some concepts are known as syndromes. Warren (26) defines syndrome as an aggregate of symptoms. The symptom may be thought of as one of the invariant characteristics of the thing or entity. Examples of syndromes in the field of human maladjustment are hysteria and schizophrenia. There does not seem to be any reason for limiting the term syndrome to manifestations of maladjustment, however. Any behavioral complex might be thought of as a syndrome, and in fact Maslow (22) has used the term in discussing the organization of personality traits.

Psychiatric literature occasionally contains implications that an entity is to be distinguished from a syndrome or at least that not all syndromes are entities. The reason for this view is not clear but from the context of such statements it seems that the writers restrict the term entity to occasions when the etiology is fairly well known. This does not seem to be a good reason for making the distinction.

Occasionally a distinction is made between syndrome and mental

disease, though again the basis for the distinction is not explicit. Sometimes the distinction seems to be that the disease is the cause of the syndrome. For our present purpose we shall make no such distinction. A syndrome is a behavioral complex the existence of which is evidenced by the concurrence of a group of symptoms.

It is possible that there are hierarchies of syndromes. A group of symptoms existing in conjunction constitute a syndrome, such as kleptomania. Briefly this syndrome would consist of two main symptoms, taking the property of others and the report of a feeling of compulsion. But kleptomania might occur together with other similar syndromes to form a more complex organization known as psychasthenia. Viewed in this connection kleptomania would be called a symptom. Whether this is a proper view of psychasthenia or whether psychasthenia should continue to be recognized as a syndrome may be questioned. We intend only to illustrate the possibility of hierarchical organization of symptoms.

Syndromes are frequently named in accordance with the supposed etiology, as for example neurasthenia and hysteria. Sometimes the name signifies what is thought to be the most striking characteristic of the pattern, as schizophrenia and manic-depressive psychosis. This latter procedure is much more desirable, though perhaps in the interest of scientific caution an even more objective designation, a letter or nonsense syllable might be justified.

The ordering of symptoms into syndromes is then one type of explanation. It is a preliminary stage in the scientific process. A symptom may be explained by saying that it indicates (not it is *due* to) the existence of the syndrome.

A case of stealing may be explained by saying that it indicates psychasthenia, or a case of amnesia by saying that it indicates hysteria. There are those who will say that this is no explanation at all; it is merely naming. They will be right if the person for whom the explanation is intended knows nothing about psychasthenia or hysteria. To him who does it will mean, in the first case, that the objects stolen were not used by the thief; they were taken because of an unaccountable urge. No ordinary means of curbing the stealing will be effective; psychotherapy is required. In the second case, the informed person will know that hysterical amnesia did not result from a physical trauma, that it represents a flight from an intolerable situation.

This process of explaining a symptom by showing it to be one element of a syndrome is what is often meant by diagnosis. This seems to be the meaning held by Henderson and Gillespie (15, p. 21) when they say, " . . . it is not the diagnosis that matters, but the understanding of the disorder. . . ." Obviously for them identifying a group of symptoms as belonging to a syndrome is one thing, but understanding it is something else.

Henderson and Gillespie seem to disparage this sort of diagnosis and they are by no means alone in such an opinion. McDougall (**20**, p. xi), speaking of the purpose of his own book, says, "Its standpoint is . . . that of a student of human nature. It is therefore but little concerned with classification of diseases." Shaffer (**24**, p. 187) differentiates abnormal psychology from psychiatry by saying that while the former aims to understand the origins of abnormal behavior, the latter seeks to classify and cure it." Bentley (**5**, p. 3) separately classifies those whose interests in mental disorder are chiefly in the routine of classification and care.

True it is that psychiatric practice has often appeared to express belief in a mystical and final quality supposed to inhere in classification. This however is not the general view. It has previously been pointed out (**21**, p. 111) that the aim of all scientific endeavor is the description of a multitude of phenomena in terms of a few categories. These categories are dynamic concepts, but the delineation of static descriptive categories seems to be a necessary preliminary. Cattell (**8**, p. 560) expresses it by saying that the law that nosology precedes etiology is not easily broken. One wonders too how cures may be effected without understanding, save by limited empirical treatments. It is again the issue of description as opposed to explanation. Geldard (**13**) clearly shows that explanation is but a more advanced form of description. It is true that full understanding is not achieved by means of nosological classification, the description of syndromes, but, if the entities are looked upon as provisional, such classification may be, and doubtless has been, a necessary preliminary. Relating symptoms to syndromes is but a preliminary phase of explanation.

However useful the description of entities may be, it is necessary to recognize certain difficulties which are encountered in so doing. These difficulties are especially notable when dealing with the psychoneuroses and psychoses. Anyone with receiving-ward experience knows how often the individual case fails to fit neatly into any of the available categories. There are any number of confusion symptoms which obscure the syndrome in much the same way that confusion color-sensitivity tests disturb the judgments of the color-weak individual. One is often inclined to doubt the existence of disease entities or syndromes save as unexplained special cases. Yet these stereotypes do exist. Cobb (**9**, p. 208) has commented upon the fact that in spite of the wide diversity of ways in which human beings vary, disease entities are discoverable.

This lack of clarity or sharpness of delineation of the syndrome reveals itself in two ways.

*First, it is difficult to discover an invariant conjunction of symptoms which constitute a syndrome.* What for example, are the invariant symptoms of psy-

chasthenia? Certainly kleptomania is not. Neither are abulia, a phobia, depersonalization, or doubts and scruples. This difficult situation will have its analogue later in the discussion of the causal relation.

It should be noted that not all complexes to which the term syndrome may be applied exhibit this same lack of invariant conjunction. If we think of kleptomania not as a symptom related to a syndrome, but as a syndrome itself, then it appears that a case of invariant conjunction is fairly well established. Feelings of compulsion and appropriating the property of others are invariably associated. In fact we do not use the term kleptomania unless these two aspects of behavior do occur together.

The situation may be clarified by considering an analogy. One instance of invariant conjunction of characteristics or properties is water. It has certain physical characteristics, such as density, viscosity, and boiling point. Each of these has a certain value under a certain set of prescribed conditions. The pressure under which water exists will change both its density and its boiling point. How and why this is so is understood when the cause of the properties is understood, namely the molecular structure.

Is it not possible therefore that under certain fixed conditions psychasthenia would always manifest the same symptoms? It may be the fact that the mechanism which brings about the psychasthenic reaction operates under a great variety of situations which accounts for the varying content of the syndrome. It is the extreme variability of response of which the human organism is capable that is probably responsible for the diverse forms of the syndrome. Psychasthenia is thought to exist because all the above-mentioned symptoms are occasionally found to occur together and more often two or three are found to occur together. The syndrome is a central tendency rather than a fixed pattern with fixed boundaries or an invariant conjunction. It is best thought of in statistical terms.

Westaway (27, p. 217) describes such central-tendency concepts and uses biological species as an example. Shaw (25, p. 37) quotes Bergson as saying that a group must not be defined by the possession of certain traits but by its tendency to emphasize them. That is, in the syndrome certain characteristics are more likely to appear than not.

*A second reason that a syndrome often lacks clarity is that, not only are some symptoms absent when the syndrome is considered to be present, but also a given symptom may be present in more than one syndrome.* A flushed face may be observed in anger, embarrassment, and physical exertion. We diagnose the significance of the flushed countenance on the basis of other symptoms or from the character of the situation. When such identification has taken place we may even give the symptom a different name, e.g., blush rather than flush. Now in this connection the introductory statement about the added significance of a number of symptoms may be interpreted. Since the joint occurrence of two symptoms is highly improbable on the basis of chance, there must be some other reason for the concurrence, some causal factor. The two symptoms are thought to be a part of a syndrome of which still other components may be found.

These difficulties in defining a specific syndrome point to the need for a statistical interpretation. Invariant conjunction is too rigorous a criterion. Statistical interpretation will be made in terms of correlation and factor analysis. First, however, let us consider the problem of causal explanation.

## Symptoms Causally Explained

Symptoms are events which have antecedents, and the concurrence of symptoms in frequencies greater than chance likewise implies some antecedent condition. The establishment of syndromes is preliminary to the discovery of etiology. This procedure is an example of explanation by referring to the second kind of order listed by Cohen and Nagel, namely causal explanation.

Diagnosis then ultimately requires knowledge of etiology. We want to know the cause. This may be thought necessary merely to satisfy curiosity or it may be desired so that effective therapy may be instituted. Of course therapy does not always await the discovery of etiology. We have empirical treatments, of which shock therapy is currently one of the outstanding examples. Even if knowledge of etiology were not necessary for completely satisfactory therapy we would still need such knowledge for prophylaxis and hygiene.

When we wish to know the cause we may mean that we want to know the essential conditions, not observable directly, which account for the syndrome. This is what Lewin (19, p. 30) refers to as systematic causation. The clinician finds it difficult to be content with this sort of causation and seeks to explain the existence of the syndrome in terms of Lewin's historical causation, referred to by Johnson (18, p. 515) as nmemic. The clinician wishes to know the way in which the individual got the way he is. Compensatory behavior may be explained by saying that it is exhibited by an individual who feels inferior and has certain other traits. We wish to know more. How did he develop the inferiority attitude and the other traits which combine to constitute the compensatory response?

The nature of the causal relation may be defined in a practical way without recourse to metaphysical interpretations. Such a practical definition is provided by Mill's canons. Referring to these, Bennett and Baylis (4, p. 377) state, " . . . the methods, insofar as they are applicable, suggest statements of minimal conditions which characters must meet to be causes or effects." The canons show the operations by which causal explanation may be approached; they do not assure proof.

Johnson (18) has developed a logical definition of causality related to theorems of material implication which is as follows:

$$P \mathrel{c} Q. = .(PQ')'$$

The relation c is invariant and as follows: It does not happen that Q fails if P happens, nor that P happens if Q fails. For example, if P represents the habit of repression (inhibition of recall) and Q is a phobia, then if "P c Q" is true, whenever there is a habit of repression, then there will be a phobia. Furthermore, whenever an individual does not have a phobia, he will not have the habit of repression. No one is ready to accept this illustration as being in ac-

cord with the facts, therefore we cannot say that a habit of repression is the cause of a phobia. Yet there is considerable clinical evidence to show that the two phenomena are related.

In the case in which P happens but Q fails to appear, that is, an individual has the habit of repression but does not develop a phobia, it is clear that the habit of repression may be necessary for the development of a phobia, but not sufficient for it. There must have been a fear response in a situation involving also a guilt-feeling response. It takes at least three conditions to bring about the effect. The cause then is a complex made up of a number of factors.

Some of the factors may be negative ones. It may be that the effect Q will occur if factors, n, c, and p are present and m is absent. The factors present may be related to each other in various ways, quantitatively expressed. For example, Q may follow from 3x plus 2n and not from 3x plus n. Wolf (**28**, p. 109) defines the cause of an event as the minimum totality of conditions which are necessary and sufficient. If an invariant relation is to be established, P must be considered complex.

If we should discover a case in which a phobia existed and there was not a habit of repression, then we would conclude that a habit of repression is not necessarily an antecedent of phobia.

As Johnson describes the c relation, it is non-symmetrical, that is, the presence of Q does not insure the presence of P. For example, of we believe that an individual with intelligence below a certain point will fail a course, we would not infer that because a student has failed the course his intelligence is below the prescribed level. This may lead us to conclude that for an effect there may be a plurality of causes. Failure of a course may then be due to lack of effort, lack of adequate prerequisites, as well as low intelligence.

How then can we ever hope to diagnose a particular case of failure? Cohen and Nagel (**10**, p. 270) suggest getting around this difficulty by considering the effect as not properly analyzed. We must recognize that all cases of failure are not the same. The best objective definition of failure, falling below a certain score on an examination, is then only one aspect of the effect. We must discover other aspects of the total effect, namely the student's attitudes, his study activity, and other circumstances. Otherwise we would be left with the only common element in all cases of failure, namely lack of knowledge or skill. Such a conclusion is not very helpful.

This treatment of the difficulty of plurality of causes is tantamount to defining the causal relation as symmetrical, a condition, which Johnson recognized only as a special case. His more general case describes only the detection of a causal factor common to several diverse effects.

This discussion of explanation of a symptom by relating it to a causal order has brought out difficulties similar to those encountered in relating symptom to syndrome. High probabilities of association can be established but invariant relationship is difficult to establish in either case. Establishing causal relations is seen to require either the analysis of a complex effect into component syndromes or the discovery of the syndrome to which an apparently isolated symptom belongs. The dis-

covery of the syndrome and discerning causal relations usually go on contemporaneously.

In the situations in which we seek causal relations, both P and Q are complex and confounded with other factors. In the physical sciences analysis of both cause and effect has been possible by experimental control. The separate and conjoint effects of the several causal factors have been described in functional terms, and invariant relations have thus been established. That this can be done in psychology is at present a remote possibility. Guilford (**14**, p. 573) goes so far as to say it cannot be done.

## Statistical Interpretation Desirable

Nevertheless associations between effects and causal factors have been achieved. How have such relations been established when, logically, you either have a causal relation or you do not? The answer is that implicit statistical inferences have been made. It is not necessary to await experimental control, however desirable it would be, when the statistical approach is available. It is an approach suited for the purpose of "relating a universe of causes with a universe of effects" (1, p. 370).

It is desirable to make an open avowal of a statistical approach, and as Brunswik (**6**, p. 262) says, "become statistical throughout instead of being statistical where it seems hopeless to be otherwise." Steps in this direction have certainly been taken in the past but they are becoming increasingly noticeable. Dodd (**11**), for example, has gone so far as to give logical analysis a statistical interpretation. Specifically, the identification of syndromes and the discovery of causal relations may be conceived of statistically. Correlation analysis, especially factor analysis, provides an excellent conceptual framework for these tasks. The statistical approach does not mean neglecting the individual exceptions as Babcock (**3**, p. 19) charges. The individuals who do not fit the general trend spur the statistician to more comprehensive analyses.

*Correlation Analysis.* Whenever a clinician notices that two symptoms occur together he is recognizing the existence of positive correlation. When one of the symptoms is observed he is inclined to look for the other, with an expectation determined by the standard error of estimate. Lack of perfect correlation suggests that one of the symptoms may occur independently of the other and possibly in association with a third symptom. Or, it is possible that the second symptom is negatively correlated with a third symptom which is present, but uncorrelated with the first one. This third symptom may thus be any chance factor in the environment. Intercorrelations, some positive and others negative, if fairly large, serve to define a syndrome. It is apparent

therefore that the more positively-correlated symptoms that are actually observed in conjunction the more certain it is that the entire syndrome is present. Finally, intercorrelations between symptoms whether it be two or more than two, indicates communality. It is not necessarily true that this communality represents a causal factor, but when the phenomena are contemporary it seems reasonable to define it as a causal factor or complex of factors. It is however possible to speak in terms of systematic causation and speak of the syndrome as caused by the concurrence of certain factors which show intercorrelations.

It is possible to make inferences concerning the nature of the causal factors accounting for intercorrelation between symptoms. This would be possible if, on the basis of clinical evidence or deductions from experimentally established laws, crude as they may be, the cause of one or two of the symptoms may be established. However, it would be much easier to determine causal relations if we had correlations between symptoms and antecedents.

If a given antecedent is correlated with a certain symptom we may have evidence of a causal relation, although both antecedent and symptom may be consequents of some other factor. In the interests of brevity this possibility as well as the case of negative correlation will be neglected. Any positive correlation which exists will in all probability be less than perfect. The existence of a pronounced fear situation in the history of an individual may be correlated with the existence of a phobia, though not perfectly. This indicates that some other factors are necessary for a phobia to occur. Each of these other factors will be positively correlated with the occurrence of a phobia. If all necessary factors are known, the multiple correlation of these factors with the existence of phobia will be perfect. This is a statistical definition of complexity of cause.

Lack of perfect correlation between antecedents and symptom may seem to indicate plurality of causes. As an example, a number of factors will each show positive correlation with delinquent behavior. Now delinquency is not a syndrome but can be analyzed into various differentiated syndromes. If this is done and correlations between each of the same factors and the occurrence of each of the resulting syndromes are again determined, some would reduce to zero and others would become significantly larger. In such a case the multiple correlation between the antecedents and unanalyzed delinquency would probably be no greater than the largest zero-order correlations. In reality the situation is one in which a number of syndromes are subsumed under one head, namely delinquency, on the basis of one symptom, an illegal act. This is the true situation in every case where plurality of causes

seems to be indicated. The notion of plurality disappears when the syndromes which contain the one particular element, the illegal act in this case, are differentiated.

Knowing correlations between antecedents and symptoms permits certain generalizations which may be referred to as "probability laws" (6, p. 269). The regression equation relating a causal factor and a symptom will not assure perfect prediction; when the influence of the specific causal factor is removed certain net relationships will remain. Ezekiel's (12) methods for analyzing these net relationships are suggestive of methods of approach to the problem of complex causation.

Certain possible forms of relationship between causal factors and symptoms have not received the attention they deserve. For example, a variable may become significant only when it exists in an amount above a certain critical point; for values above this point the correlation between the antecedent and the consequent might be very high. The same thing might be true when the value of the variable falls below a certain point, though of course this would be changed into the first case by reversing the scoring. Furthermore, a variable might be significant only at the extremes of the range. The correlation with any syndrome or symptom in the middle range might well be zero but be high when values at the extremes are used. A scatter-plot could be made by giving values to the measure of the trait which begin at zero for the upper and lower critical points and increase in magnitude toward the extremities. Flanagan's C2 factor obtained by the Bernreuter Personality Inventory seems to promise likely vindication of this point. Finally, the possibility of curvilinear relationship must never be overlooked.

*Syndromes and Factor Analysis.* In addition to the possibilities of correlation analysis just described there is now available a well-developed factor theory which provides a comprehensive framework in which to interpret associations among symptoms and between symptoms and their antecedents.

If it is possible to consider the human traits usually involved in factor analysis studies as symptoms, as noted above, then it is reasonable to apply factor analysis methods to the forms of behavior usually referred to as symptoms. These symptoms are evidence of malfunctioning or maladjustment.

If a large number of symptoms are correlated with one another the results can be arranged in a correlation matrix. Such a set of correlations could very probably be re-arranged to form groups. The intercorrelations within a group would be greater than the average intercorrelation between members of the group and those items not included in the group (16, pp. 23–24). These groups would represent syndromes.

If all the symptoms could be included in such groups, with none

having correlations with those in other groups we would have an arrangement described as the uni-factor pattern. Any symptom not included in a group might become a member of a new group if other symptoms were included in the correlations.

That such a situation might be found, even if a complete catalogue of human symptoms and an infinite population of individuals could be considered is possible but unlikely. There is too much clinical evidence showing that many symptoms are found in more than one clinical entity.* Thus it is most likely that a small number of groups would be obtained but that there would be significant correlations between symptoms in one group and symptoms in other groups. This situation suggests a bi-factor pattern. The syndromes (groups) are sub-groups of maladjustment symptoms. It is further possible that with a very large sample of symptoms we would obtain several large groups each with several sub-groups; in other words, several flights of hollow staircases. One such staircase might very well be the psychoneuroses where the sub-groups would be hysteria, psychasthenia, neurasthenia, anxiety neurosis, and perhaps some others.

A multiple-factor solution might imply that all factors discovered would enter into the production of most if not all the symptoms. However, if the axes are rotated so as to yield as many zero loadings as possible the result, as far as defining syndromes is concerned, might be little different from other solutions.

The existence of correlated factors is also consistent with the concept of syndrome. Each of the oblique axes would pass through a cluster of symptoms. Some of the items of each cluster would have loadings on the other factors, a condition wholly in accord with the observation that many clinical entities have symptoms in common.

*Etiology and Factor Analysis.* The existence of a group of symptoms requires some explanation since it is not conceivable that such a syndrome is due to a chance concurrence. The most satisfactory explanation is one in terms of cause. We may believe that a syndrome exists as a result of some cause. This does not tell us the nature of this cause and, in the terminology of factor analysis, we may refer to it noncommittally as a factor.

The nature of a factor must be determined by inferences from the nature of the symptoms to which it is related. The argument follows the form of Mill's canons. Noting the symptoms that are most closely related and the least closely related is one good means of obtaining a clue to the nature of etiology.

* Of course it is possible that the clinical entities are wrong. The work of Moore (23) certainly suggests this possibility. Hunt (17, p. 47), speaking of the need for experimental studies, expresses doubt of the validity of current diagnostic categories.

It would be much easier to make valid inferences regarding the nature of the factors if an analysis was made of a matrix of correlations between symptoms and antecedents. In this case the causal complex and related syndrome would form a group or sub-group.

The various factor patterns mentioned above take on additional meaning when antecedents are involved in the analysis. A uni-factor pattern would imply that the causal factor that enters into the production of one syndrome is not involved in the production of any other syndrome. The bi-factor solution could be interpreted to mean that one causal factor was involved in all the syndromes, not necessarily to the same degree, and that the sub-groups or differentiable syndromes were produced by other factors, one for each syndrome. The multiple-factor and principal-factor patterns presuppose several independent factors involved in all syndromes but in different degrees, and of unequal importance. In addition, the principal-factor pattern allows for bi-polar factors, so that a syndrome may be described by the presence of certain factors and the absence of others. It is also possible to consider the factors as correlated rather than independent. Belief in a fundamental unity of the organism will make a system of correlated factors seem the most likely final solution to the problem of the organization of human functioning.

When considering maladjusted behavior alone it is conceivable that we might discover the obverse of the situation which would be presented if we were considering adjustive responses. The difference may be that of abilities compared with disabilities. If both kinds of items entered into a correlation matrix it is probable that some sort of bi-polar analysis would be most desirable, especially since there is great difficulty in defining the zeros of traits.

The causal factors discovered by such an analysis would be of the same order as those discovered by inferences from clinical observation. They would be personality traits, expressed either positively or negatively. There would probably be hierarchies of response systems. One important factor which might be discovered is adaptability or lability. Some individual act in stereotyped fashions while others are more labile and given to frequent readjustments, a characteristic which Angyal (2, p. 293) attributes to systems within the personality organization.

The probable outcome of a general analysis of an extremely wide range of behavior functions including abilities and disabilities, antecedents as well as consequents, represents a program for the future. In such an analysis, uniqueness would vanish and common-factor (very probably correlated-factor) variance is all that would remain. With such a prospect in view, it is clear that present limited correlation matrices must be interpreted with their limitations noted. It would

seem wisest to give serious consideration only to those factors which contribute most. Remaining variance should not be considered as ultimate uniqueness until a sufficiently wide sampling of symptoms has been used and it has actually been determined that certain variance is unique.

Insofar as the clinician attempts to diagnose by referring individuals to a diagnostic category he is participating in the support of a type theory. To say that an individual is schizophrenic is to classify him as a "type" of person. Zubin (29) has devised a statistical means of identifying types, and the inverted factor technique developed by Stephenson and others has been acclaimed as the ideal means for such a purpose. However, Burt (7, p. 191) shows that the results of the inverted factor analysis must ultimately be the same as those of the usual analysis, provided that the sample of persons and tests or items is adequate. In this relationship between the results of the usual factor analysis and those of the inverted factor analysis lies the basis for explaining both the popular belief in types and the clinician's belief in discrete disease entities. The type is a syndrome, a clustering of symptoms or traits, brought about by the presence of certain factors. Whether a particular individual will illustrate such a syndrome depends upon the degree to which he possesses each of the factors responsible for the clustering.

This may best be illustrated in terms of a bi-factor pattern. Assume three factors, one general and two group. Assume further that each individual has some amount of each of these factors. Now, if the general factor and the first group factor define one syndrome and the general factor and the second group factor define another, then if an individual has large amounts of the general factor and the first group factor he will be a typical case of the first syndrome. If however, instead of having a large mount of the first group factor he has a small amount of it but has a large amount of the second group factor he would then be typical of the second syndrome. If he had other amounts of the three factors, for example amounts proportional to the total contribution of the factors, he would not be typical of either syndrome and probably would be classified as a mixed or impure type, as is the custom of those who are naive about type notions.

The fact that clinical entities and personality types do have some provisional status at all suggests that perhaps a bi-factor pattern arranged to express positive and negative loadings may be a good approximation of the organization of abilities and disabilities. A more complicated pattern involving oblique factors may possibly turn out to the best of all.

Our main interest in this discussion has been in diagnosis. However, in conclusion it may be noted the process of prediction is the reverse of diagnosis. In the former procedure certain traits are known and the

probable behavior of an individual in a certain kind of situation is estimated. The success of prediction depends upon the completeness with which relevant factors have been isolated and the validity with which they can be evaluated. In the case of diagnosis, the behavior of an individual is observed and the task is to determine the factors which brought it about. Discoveries by those whose main task is diagnosis and by those who study prediction techniques are complementary. In either case, errors of estimate must be taken into account. In one case we have the regression of Y on X; in the other, of X on Y.

## SUMMARY

The requirements of a rigorously defined causal relation are hard to meet. The most suitable conceptual approach is a statistical one. Symptoms and syndromes, when thought of as statistical concepts, can be better understood. Correlation analysis, including factor analysis, provides a means of clarifying and organizing the complex assortment of antecedents and consequents which confuse the clinician. By these means it is possible to relate the symptoms of adjustment and maladjustment into one conceptual pattern. Only the outlines of such a prospect are now possible, yet some steps toward filling in the outlines have already been taken.

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# PSYCHOLOGY AND THE WAR

Edited by
DONALD G. MARQUIS

CONTENTS

PERSONNEL PROCEDURES IN THE U. S. MARITIME SERVICE, by *Luigi Petrullo* ..... 177
THE VALIDITY OF THE MULTIPLE CHOICE RORSCHACH TEST IN OFFICER CANDIDATE SELECTION, by *M. B. Jensen & J. B. Rotter* ..... 182

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## PERSONNEL PROCEDURES IN THE U. S. MARITIME SERVICE

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A description of the work of the United States Maritime Service in training men for service in the merchant marine, and of the part that officers and men with psychological training are contributing to this work, has been published.* In the previous report, classification and selection activities dealing chiefly with trainees were outlined and brief mention made of the developmental work being conducted in the area of personnel procedures for all Maritime Service enrollees assigned to administrative duty. The present report is a further description of the work of the Personnel Procedures Unit in the overall program.

The Personnel Procedures Unit of the U. S. Maritime Service was established in June, 1944, by order of the Commandant. The Unit represents a logical development and expansion of research activities started by Classification and Selection Officers in the various training stations. It is the product of the efforts of many individuals in the Maritime Service who have tried to deal intelligently with various personnel problems.

In the original directive setting up the Unit, its functions were defined as follows:

1. To survey current personnel operations and practices.
2. To devise improved personnel operations and techniques.
3. To prepare indoctrination and educational materials for all Maritime Service personnel.
4. To explain, demonstrate, and supervise newly developed techniques and operations whenever necessary.

* LIMBURG, C. C., Psychological Work in the United States Maritime Service. *Psychol. Bull.*, 1944, 41, 664–668.

FIGURE I

PERSONNEL PROCEDURES UNIT: FUNCTIONAL ORGANIZATION

*Officer-in-Charge*

Plans, directs, and coordinates the development of personnel procedures and techniques, and the control of personnel qualifications records and procedures.

*Administration Officer*

Acts as liaison officer between Maritime Service units and central office. Responsible for administrative activities of Unit.

| *Billet Analysis Department* | *Examinations Department* | *Educational Services Department* | *Qualifications Control Department* | *Classification Methods Department* |
|---|---|---|---|---|
| Analyzes all rates and ranks in the U.S.M.S. and all jobs in the U. S. Merchant Marine, and prepares job specifications for use in recruitment, selection, upgrading, transfer, and related functions. Conducts organizational surveys of Maritime Service units as required. | Prepares standard examinations for use in determining the skills and abilities of enrollees in order to assist in the proper assignment, classification, promotion, and transfer of enrollees. Prepares standard examining procedures and assists Maritime Service units with all examining problems. | Collects, revises, prepares and distributes educational materials for use in Maritime Service units. Coordinates and assists in administering educational programs conducted in the various Maritime Service units. | Develops personnel forms for the purpose of preparing administrative personnel files. Maintains central files of all personnel. Controls the assignment and transfer of administrative personnel from station to station. | Prepares classification and selection techniques and procedures for use with trainees and administrative personnel. |

In order to carry out these functions, the Personnel Procedures Unit was organized into five departments. Figure I shows the functional organization of the Unit.

As indicated on the functional organization chart, the overall supervision of the activities of the Unit is the responsibility of the Officer-in-Charge. For practical reasons the Unit is under the cognizance of the Atlantic District Operations Office. Technical liaison is maintained with Headquarters through the Chief Classification and Selection Officer in Washington. Through this means it is possible to make available to all units of the Maritime Service products which are developed in the Atlantic District.

Under the Officer-in-Charge there is an Administration Officer responsible for the administrative activities of the Unit. This officer also acts as liaison officer between the Personnel Procedures Unit and the various Maritime Service units in the Atlantic District.

Descriptions of the five departments in the Unit follow:

*Billet Analysis Department:* The Billet Analysis Department analyzes rates and ranks within the Maritime Service as well as jobs in the merchant marine. This information is being used for a variety of purposes, such as recruiting, screening, selecting and classifying, transferring, upgrading, and informing personnel; planning and budgeting; eliminating duplicate effort; aiding in the evaluation of the training program; assisting in preparing publicity materials; planning new departments; developing aptitude and achievement tests and application forms; assisting medical officers and enrolling officers; and orienting enrollees.

The analysis of billets in the Maritime Service is now nearing completion. As a result of surveys in one large station and in a number of smaller Maritime Service units representative material has been accumulated. A volume of preliminary job specifications based on this material is currently available. The special duties assigned to each rate in the Maritime Service have been defined and the results have been distributed to Maritime Service personnel.

*Examinations Department:* This department is mainly concerned with the development of examinations and standard promotion procedures. The procedure used in the development of examinations includes the following steps:

1. *Billet analysis:* Through such analysis, the exact duties of each rate are ascertained and described in detail.
2. *Collection of questions:* At the same time that the job is being analyzed, questions designed to reveal the knowledge necessary for the performance of these duties are collected by observing and interviewing experts on the job.
3. *Checking questions:* Questions and answers are then checked by other experts to make sure that they pertain to the job and that the answers are accurate.

4. *Trying out questions:* The best questions are then tried out on men whose abilities are fairly well known. For the most part, those questions are retained that are consistently answered correctly by the *good* men and incorrectly by the *poor* men and about which there are no disagreements as to meaning.

5. *Developing final forms of examinations:* Questions are tested for validity and reliability and the test is put into its final form. Norms are then developed.

6. *Developing alternate forms:* With the questions thus selected as guides, similar questions are collected, tested and selected for alternate examinations.

Through these means, the Examinations Department makes up valid and reliable examinations that will test each person on what he must know in each rate. At present promotion examinations are available for rates in the seaman, artificer, special, and commissary branches. Eventually, all rates in the Maritime Service will be covered. The Examinations Department is also interested in devising standard examination procedures at all units, and is ready to assist all units with examining problems.

*Educational Services Department:* "The preparation of indoctrination and educational materials for all Maritime Service personnel" has been turned over to the Educational Services Department. In the development of these materials, this department works very closely with the other departments already mentioned, as well as with various units of the Maritime Service.

Probably the most important job being undertaken by this department at the present time is the establishment of Ship's Company Schools for newly appointed administrative personnel. Several of these schools are being set up in the U. S. Maritime Service Training Stations with present courses of indoctrination and practical training lasting for a period of from four to five weeks. The new administrative enrollee, upon completion of the course, will be assigned to the particular administrative job for which he best qualifies.

For men already on administrative duty, the Educational Services Department is working on an in-service training program, designed to give general and specific training while on the job.

In addition, the Educational Services Department is preparing a series of pamphlets and booklets on various subjects for distribution to all units to inform men about the Maritime Service, to assist them in preparing for promotion examinations, and to help promote uniformity. Under preparation now are brief articles on Maritime Service Customs and Courtesies, Rates and Ranks in the U. S. Maritime Service, Information on USMS Uniforms, USMS Instructions, and a short History of the American Merchant Marine and the U. S. Maritime Service.

*Qualifications Control Department:* The Qualifications Control Department was set up to survey current personnel operations and prac-

tices and improve them wherever possible. As part of this work, it has developed a Qualifications card ("Q" card). This card provides a complete service record for each enrollee. It includes such personal data as age, height, weight, and marital status and a record of the specific qualifications of the individual enrollee. In addition, it shows the results of the various classification tests, civilian experience, attitudes as reflected in the man's work and disciplinary record, and the service record of the enrollee. Such information, when recorded on standard machine sorting forms, materially assists in the proper placement, transfer and upgrading of personnel.

*Classification Methods Department:* This department is interested in classification and selection problems. Its functions include the analysis, revision, and development of aptitude tests used in the Maritime Service as well as the routine machine scoring of tests used in several units of the Maritime Service.

Typical of the problems undertaken by the Classification Methods Department is the item analysis of tests. Through such analysis, it is possible to tell what percentage of enrollees taking a test answered a particular item correctly or incorrectly, and to determine the relationship of these results to other information about enrollees such as age, education, experience, and performance on the job. This analysis is, of course, useful in determining the effectiveness and reliability of tests.

It is still too early to judge the ultimate value of the work of the Personnel Procedures Unit from the standpoint of improvement of efficiency in all personnel activities. At this date, however, it is apparent that the extension of psychological and related techniques in the Maritime Service will prove of inestimable value in dealing with the multitude of personnel problems which require the sound application of scientific procedures for solution. Job specifications, scientific organizational surveys, standard promotion examinations, comprehensive indoctrination and in-service training materials, qualifications control and other improved personnel techniques are bound to lead, when properly administered, to the greater efficiency and satisfaction of personnel.

# THE VALIDITY OF THE MULTIPLE CHOICE RORSCHACH TEST IN OFFICER CANDIDATE SELECTION

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The Multiple Choice Group Rorschach Test devised by Harrower-Erickson (1) was given to a select group of army officers and to three classes of the Armored Officer Candidate School in the fall of 1943. Harrower-Erickson in her original article (1) described findings with a variety of groups of maladjusted and normal adults. From these studies she concluded that the test may be used successfully for the screening of neuro-psychiatrically disturbed individuals, although the test in its present stage of development could not be expected to indicate differential diagnosis. Early in 1944 Wittson, Hunt and Older (5) published an account of their experiences with this method in which they found that the Group Rorschach failed as a screening test in military selection and that a much larger per cent of *poor* responses were made by normal populations tested than was found by Harrower-Erickson. The present study is a further check on Wittson, Hunt and Older's results and provides comparisons between the Multiple Choice Rorschach Test and other personality disturbance screening tests.

The group of officers studied was chosen by unit commanders as a normative group to be used in a general study of officer candidates. These officers were to fit the criterion of "actually excellent officers" and were a highly selected group. All of them took the tests voluntarily and were assured anonymity. The test papers of each individual bore the same number for identification. Fifty-six excellent officers between ages 20 and 30 years, inclusive, were thus selected.

The entire enrollment of three officer candidate classes comprising 257 students also were examined. The candidates constituted a select group but were not as superior as the excellent officers.

In addition to the Multiple Choice Rorschach Test three other personality screening tests were given to these groups:

1. *Health Inventory* consisting of 38 self-rating items with particular reference to psychosomatic complaints. This is an unpublished scale devised by the senior author. The score consists of the number of *unhealthy* responses.

2. *Psychasthenic Inventory* consisting of 48 self-rating items taken from Part IV (Psychasthenia) of the Minnesota Multiphasic Personality Schedule (2). The score consists of the number of *unhelathy* responses.

3. *Group Level of Aspiration Test*, an unpublished pencil and paper test based on the individual level of aspiration personality test described by Rotter (3, 4). This test purports to measure such traits as aggressiveness, ambition, cautiousness, security, emotional stability and their opposites. Scores are given by assigning one of nine patterns to each record (4). These patterns are placed

for statistical treatment into three groups of *good, questionable* and *poor* for the purposes of this paper. The designation of *good, questionable* or *poor* refers to the adequacy of the personality traits characteristic of each pattern for actual or potential officers.

Clinical and some experimental evidence has shown these tests to be valid as screening devices for specific types of maladjustment but not for all maladjusted individuals. The Harrower-Erickson Multiple Choice Test purports to select from the general population "individuals with very different types of disturbances who might otherwise escape detection" (1, p. 341).

The same method of administration was used as described by Harrower-Erickson except that the Rorschach cards were projected on a screen by a baloptican.

TABLE I

MULTIPLE CHOICE RORSCHACH SCORES FOR EXCELLENT OFFICERS AND FOR OFFICER CANDIDATES

| | *Excellent Officers* | | *Officer Candidates* | |
|---|---|---|---|---|
| *Score* | *N* | *%* | *N* | *%* |
| 0 | 2 | 4 | 13 | 5 |
| 1 | 6 | 11 | 27 | 10 |
| 2 | 7 | 12 | 61 | 24 |
| 3 | 16 | 28 | 66 | 25 |
| 4 | 13 | 23 | 34 | 13 |
| 5 | 6 | 11 | 27 | 10 |
| 6 | 4 | 7 | 10 | 4 |
| 7 | 2 | 4 | 10 | 4 |
| 8 | | | 4 | 2 |
| 9 | | | 4 | 2 |
| 10 | | | 1 | 1 |
| *Total* | 56 | 100 | 257 | 100 |
| *Mean* | 3.4 | | 3.2 | |
| *Standard Deviation* | 1.6 | | 1.9 | |

*Findings.* Table I presents the distributions of poor or unhealthy responses on the Multiple Choice Rorschach Test along with the means and standard deviations for the excellent officer and officer candidate groups. Harrower-Erickson set four poor responses as the best critical score for initial screening purposes. That is, any individual with four or more unhealthy responses should be investigated for neuro-psychiatric disorder. Table I shows that 45 per cent of the excellent officers and 36 per cent of the officer candidates had four or more such responses. It is apparent that such high figures are incompatible with the highly selected nature of the groups studied. It should be noted that the superior group of officers had a higher incidence of unhealthy responses than did the officer candidates. These figures agree closely with those

reported by Wittson, Hunt and Older (5) for normal groups but vary widely from those reported by Harrower-Erickson (1). The findings of this study also are in keeping with an unpublished study by N. H. Kelley on the Multiple Choice Rorschach Test in the selection of candidates for nurses' training at the University of Louisville.

Although all types of unhealthy responses were common to the groups studied, color naming was particularly prominent, and failure to report anything was frequent.

TABLE II

COMPARISON OF GOOD AND POOR MULTIPLE CHOICE RORSCHACH SCORES OF OFFICER CANDIDATES WITH OTHER PERSONALITY TEST SCORES

HEALTH INVENTORY

| *Rorschach Score* | *N* | *Mean* | *Standard Deviation* |
|---|---|---|---|
| 0– 3 | 167 | 4.6 | 3.3 |
| 4–10 | 90 | 4.9 | 3.6 |

PSYCHASTHENIC INVENTORY

| | | | |
|---|---|---|---|
| 0– 3 | 167 | 6.5 | 4.8 |
| 4–10 | 90 | 6.4 | 5.7 |

LEVEL OF ASPIRATION

| | | *% Good Patterns* | *% Questionable Patterns* | *% Poor Patterns* |
|---|---|---|---|---|
| 0– 3 | 167 | 49 | 36 | 15 |
| 4–10 | 90 | 49 | 34 | 17 |

TABLE III

COMPARISON OF GOOD AND POOR MULTIPLE CHOICE RORSCHACH SCORES OF EXCELLENT OFFICERS WITH OTHER PERSONALITY TEST SCORES

HEALTH INVENTORY

| *Rorschach Score* | *N* | *Mean* | *Standard Deviation* |
|---|---|---|---|
| 0– 3 | 31 | 4.8 | 4.5 |
| 4–10 | 25 | 4.4 | 3.1 |

PSYCHASTHENIC INVENTORY

| | | | |
|---|---|---|---|
| 0– 3 | 31 | 6.9 | 6.2 |
| 4–10 | 25 | 6.5 | 5.8 |

LEVEL OF ASPIRATION

| | | *% Good Patterns* | *% Questionable Patterns* | *% Poor Patterns* |
|---|---|---|---|---|
| 0– 3 | 31 | 58 | 32 | 10 |
| 4–10 | 25 | 60 | 28 | 12 |

Comparisons of multiple choice scores with the three other personality tests used are given for officer candidates in Table II and for officers in Table III. No critical ratios between group means on the various tests are given since it is apparent from inspection that no differences approaching significance exist.

*Conclusions.* The Harrower-Erickson Multiple Choice Rorschach screening test was tried on 56 selected excellent officers and 257 officer candidates and the results compared with scores on three other personality screening tests. This test was found to be unsuitable with these groups.

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# BOOK REVIEWS

WECHSLER, D. *The measurement of adult intelligence* (3rd Ed.) Baltimore: Williams & Wilkins, 1944. Pp. vii + 258.

Since the review of the first edition of this book (Kent, G. H., *Psychol. Bull.*, 1940, **37**, 251–4), two further editions have been published, the second in 1941, the third in 1944. The most recent revision, according to the author, emphasizes the military applications of the Wechsler-Bellevue Scale. It differs from the first edition largely in presenting more elaborate discussions of mental deterioration and differential neuropsychiatric diagnosis, and in making minor changes in procedure and scoring standards. The rationale behind the scale, the technique of standardizing test items, and the method of deriving and interpreting IQ's remain essentially the same as at the time of Kent's review.

Chapter 6 outlines a method for determining quantitatively, on the basis of a single administration of the Wechsler-Bellevue Scale, the degree of a subject's mental deterioration. Based on the assumption that abilities which do not decline with age in normal subjects are those least affected by deteriorative processes in psychosis, the method involves comparing a subject's mean score on the tests which hold up with age with his mean score on tests which do not hold up with age. "Normal" deterioration for each age group is given in terms of percent of loss, and a percentage greater than 20 ($-2$ PE from mean of age group) is termed "definite deterioration." This use of obtained scores from age groups in the standardization population in measuring deterioration may be logical on a priori grounds. Whether the assumption that deterioration in psychiatric disorders follows that in senility is justified can be determined only through the application of Wechsler's technique to psychotic groups and comparison of clinical with psychometric findings. With the exception of one case study, however, no test of this assumption is reported.

Chapter 11, Diagnostic and Clinical Features, summarizes the author's impressions concerning the significance of a patient's relative performance on single subtests of the scale in the differential diagnosis of neurosis, organic brain disease, schizophrenia, psychopathy, and mental deficiency. Since the raw subtest scores expressed as weighted scores are directly comparable from test to test, it is possible to determine which subtest scores are relatively high and which relatively low for a single patient. Tables are given showing patterns of subtest scores for various clinical syndromes. The reader is told what constitutes a significant variation from subtest to subtest, and is provided with "rules of thumb" for determining diagnostically important variations, but evidence for the validity of such rules is not reported. Despite the facts outlined in Chapter 6, age is apparently not considered in this method of diagnosis.

The validity of differential diagnosis must depend upon demonstration of correspondence between inter-test variations and particular psychiatric disorders, preferably with large groups of carefully diagnosed patients, age controlled. No such analysis is presented by the author, who depends rather upon informal clinical experience in correlating pattern with syndrome. A cursory inspection of recent research on the use of the scale in diagnosis (as listed in Wechsler's bibliography) reveals that the impressionistic data found in the author's diagnostic tables are occasionally at variance with reported research results. Despite this fact, and despite Wechsler's own statement that "the data . . . are not intended, nor can they be used as psychometric short cuts to psychiatric diagnosis" (158), there are general statements throughout this

chapter which strongly tempt the hurried psychometrician to succumb to such short cuts. For example, "The correlations are sufficiently high to be of value in vocational guidance . . . " (146); "The inconsistency here is what definitely shows this case to be schizophrenic" (163). Selected cases indicate how differential subtest scores parallel clinical diagnosis.

Both in the order of presenting certain test items and in scoring certain responses, cognizance is taken in this edition of changes due to present war conditions. A convenient method of obtaining IQ's for subjects between the ages of 60 and 80 is offered. The addition of time credits to some of the verbal tests increases the IQ range at the upper end of the scale. Psychological examiners may regret the continued absence of precise statements of subtest reliabilities, and of indications of practice effects, and will recognize the repetition of minor awkwardnesses of instructions.

The thesis of the major revisions, it seems to the reviewer is that an examiner administering the Wechsler-Bellevue Scale to a single patient may obtain considerable information besides a measurement of general intelligence. Clinicians would agree that this is true of any standardized situation in which a patient is observed. In a scale which finds as wide application as the Wechsler-Bellevue, however, it seems essential that those cues which the examiner uses in assaying the patient be made explicit through the reporting of exact research results wherever possible. Unless this is done systematically by the authors and users of standard scales, the diagnosis of mental deterioration or psychiatric disorder from intelligence test results will remain inspired guesswork.

ANN MAGARET.

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CRAIK, K. J. W. *The nature of explanation.* Cambridge, England: Cambridge Univ. Press, 1943. Pp. viii + 123.

The "hypothesis on the nature of thought," which is put forth in Chapter V of this little book, is the reason for the book and the focus toward which the arguments of the other six chapters are directed. Craik's interest is not, however, in thought *per se*, but in his hypothesis as a solution to the problems of knowledge and explanation. Beginning with a critical examination of *a priorism* scepticism, relational theories, and descriptive theories, he comes out with a faith in physical explanation, in the assumption of an external world in which physical events take place according to a rigid causality, and it is in relation to these physical events and their explanation that the hypothesis about thought is advanced.

It is an extremely mechanistic hypothesis, in which the nervous system is pictured as a sort of calculating machine "capable of modelling or paralleling external events," and this process of paralleling is taken as "the basic feature of thought and explanation." The methods used to win favor for this hypothesis appear to be of two kinds. The first is a collection of instances of similar modelling in nature, *e.g.* electrical, mechanical and hydraulic mechanisms which parallel in their operation some subtle or particularly complicated external processes. Secondly, the author points out some consequences of the hypothesis, hoping, as he puts it, "to suggest their relations and linkages with other facts or fruitful hypotheses in other fields of knowledge." In so doing Craik comments on such varied topics as hedonism, law of effect, illusions, *thinghood*, hysteria, meaning, recognition, perceptual differentiation and free will.

The critical reader will wonder what is to be gained by all this; the hypothesis is not novel, and the new arguments for it are not at all rigorous. Perhaps the best that can be said is that the hypothesis is sharpened and that the plethora of ingenious analogies may in some way make the idea appear more plausible. The author is aware of the logical weaknesses of his essay and suggests the experimental method as the final test.

*Experimental method* in this book seems to mean not only a logical test of the consequences of the hypothesis but also a laboratory test, a psychological experiment. Hence psychologists are likely to ask just how closely and in what sense the model is supposed to resemble the external process it imitates. Apparently not very closely, for in the only statements on this crucial issue which the reviewer could find the author says that the model has a "similar relation-structure to that of the process it imitates," and that the nervous system models the real process in the sense that it "permits trial of alternatives, in, e.g. bridge design, to proceed on a cheaper and smaller scale than if each bridge in turn were built and tried by sending a train over it, to see whether it was sufficiently strong." This is neither startling nor specific; the author explicitly refuses "to commit himself to a definite picture of the mechanisms of synaptic resistance, facilitation, etc."

All this book has to offer to psychologists, then, is the multitude of intriguing physical analogies for psychological phenomena.

DONALD M. JOHNSON.

*University of Illinois.*

GALLUP, G. H. *A guide to public opinion polls.* Princeton: Princeton Univ. Press, 1944. Pp. xviii + 104.

Perhaps no other division of quantitative social psychology has developed so rapidly and has been so vitally concerned with social and political behavior in the past decade as public opinion measurement. The almost unbelievable accuracy of the Swedish Gallup Institute in predicting a five-party division of the 1944 Swedish election with an average error of only 0.4 shows how far progress has been made. Naturally, many questions arise regarding polling methods, the function of polls, and interpretation of results, including, of course the familiar "why is it that I have never been polled?"

Since the publication in 1938 of the AIPO bulletin, "The New Science of Public Opinion Measurement," there has been no ready reference manual to satisfy a curious and meagerly informed scientific and lay public. Cantril's excellent *Gauging Public Opinion* (1943) supplies this for the former group; the present contribution of Gallup is intended to do this for the latter. The format of the small volume consists of twelve sections covering problems such as the cross section, interviewers and interviewing, polling accuracy, question formulation, measurement of intensity, polls and democratic process, election predictions, and miscellaneous problems. Within these divisions are listed series of questions in large type followed by discussions in text type. Typical questions are: "How many persons have to be included in a poll to obtain reliable results?" and "Don't polls oversimplify complicated questions?"

Though the orientation is predominantly AIPO, there are references to other methods and viewpoints. Roper's modified attitude scale and Likert's nondirective method are given attention, but the treatment of these and other measurement philosophies tends by necessity to be sketchy rather than critical or evaluative. The reviewer believes more attention could have been given to some of the newer developments such as 'filter' questions, pinpoint techniques,

the prestige factor, and the 'past preference' error (not mentioned). Perhaps the failure to relate certain of these factors to problems elsewhere touched upon in the volume. as the measurement of prestige to indicate direction and magnitude of bias in the sample. was deemed too technical for the lay reader, or it may be that the omission reflects the fact that many technical phases of opinion measurement are still in the experimental stage. A real omission occurs in the otherwise excellent treatment of the Digest poll failure (50). The author's review of causes does not isolate the critical cause which was that two systematic biasses, *representation* and *participation*, operated during 1924, 1928, and 1932, in opposite directions and hence canceled out, whereas in 1936, one of these, *participation* (Democratic) reversed to pile up the error instead of canceling it out.

This volume will serve a real need in supplying information desired by everyone interested in social science. Opinion polls have become an established institution and an adjunct to democratic process, for better or for worse. No doubt there exists much misconception regarding their nature, functioning, and need; and the author's presentation may stimulate constructive criticism and more adequate evaluation. The author's treatment of sampling, and of the presumed 'band-wagon' influence, are especially commendable; likewise is his acknowledgement to persons identified with the development of opinion measurement. Even Congressmen could read the volume with profit.

NORMAN C. MEIER.

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## NOTES AND NEWS

KURT LEWIN, professor of child psychology in the Child Welfare Research Station, State University of Iowa, has resigned to accept a post in the Massachusetts Institute of Technology, where he will direct a research project in the field of industrial relations.

B. F. SKINNER, associate professor of psychology at the University of Minnesota, has been appointed professor of psychology and chairman of the department at Indiana University, to take effect Sept. 1, 1945.

FLORENCE L. GOODENOUGH, professor in the Institute of Child Welfare of the University of Minnosota, has been elected *Vice President* of the American Association for the Advancement of Science, and *Chairman* of the Section on Psychology for the calendar year 1945. HAROLD E. BURTT, professor of psychology, Ohio State University, has been elected *Secretary* of the Section for a four-year term.

EARL K. SEIBERT, formerly psychologist and director of guidance for the public schools of Belleville (N. J.), has been appointed director of student personnel, Green Mountain Junior College (Poultney, Vt.).

FRANCIS THEODORE PERKINS, assistant professor of psychology, Claremont (Calif.) Graduate School, has been promoted to an associate professorship.

CARL G. MILLER, dean of the College of Liberal Arts and professor of psychology at the University of Pennsylvania, has been reelected as *Secretary* of the Middle States Association of Colleges and Secondary Schools.

A grant has been made by the Sugar Research Foundation, New York City, to CURT P. RICHTER, psychobiologic laboratory, Johns Hopkins University, for investigation of the nutritive values of soft and raw sugars and of the carbohydrate-thiamine ratios taken by rats allowed free selection of all required nutrients.

HAROLD BORAAS has been appointed associate professor of psychology and education, St. Olaf College, Northfield, Minn.

JOHN ELDERKIN BELL, formerly assistant professor of psychology, Rochester (N. Y.) Institute of Technology, has been appointed associate professor of psychology, Clark University.

PETER. A. BERTOCCI, associate professor of psychology, Bates College (Lewiston, Me.), has been appointed associate professor of philosophy, Boston University.

Applications to the Committee for Research in Problems of Sex, National Research Council, for financial aid during the fiscal year beginning July 1, in support of work on fundamental problems of sex and reproduction, should be received before April 1. They may be addressed to the chairman, DR. ROBERT M. YERKES, Yale School of Medicine, New Haven 11, Conn. Although hormonal investigations continue to command the interest and support of the committee, preference, in accordance with current policy, will ordinarily be given to proposals for the investigation of neurological, psychobiological, and behavioral problems of sex and reproduction.

A small book entitled *A Handbook for Old Age Counsellors*, by LILLIEN J. MARTIN has been printed by the Old Age Counselling Center, 1019–1020 Shreve Building, San Francisco 8, Calif., which Dr. Martin founded in 1929. This book is printed as a memorial to Dr. Martin and is distributed without charge on request at the Center to those persons or agencies interested in old age rehabilitation.

*Junior Internships.* Announcement is made of two junior internships in psychology which will be open in September, 1945, at the Western State Psychiatric Hospital in affiliation with the University of Pittsburgh under the immediate direction of DR. SAUL ROSENZWEIG. Either men or women with a Bachelor's degree from an accredited university who wish to obtain clinical and research experience with mental patients while pursuing course work at the University are eligible. The combined program, to be normally completed in one and one-half or two years, leads to a degree of Master of Science in Psychology. Full maintenance at the Hospital, including board, room and laundry, is provided; courses at the University may be taken at half-rate tuition ($5 per semester credit). Appointments will be made for one year subject to renewal if requirements have been adequately met. Applications which must be submitted before May 15, 1945, should be sent to DR. GROSVENOR B. PEARSON, Director, Western State Psychiatric Hospital, Pittsburgh 13, Pa.

The following publications now available through the *American Society for the Hard of Hearing*, 1537–35th Street N.W., Washington 7, D. C., at 10 cents per copy, may be obtained by writing to that Society: *Helping the hard of hearing soldier at Deshon*, PHYLLIS MCCALMONT; *Plans for the rehabilitation of deafened service men*, HENRY T. MONCURE; *Progress report on the Army's program for the rehabilitation of the deafened*, MAJOR WALTER E. BARTON, M.C.; *Recreation in the programs for the rehabilitation of the hard of hearing at Deshon General Hospital*, SARA BOMBERG; *The Navy's program for rehabilitation of the war deafened*, CAPTAIN FREDERICK A. JOSTES, U.S.N.R.; *The Veterans Administration program for the vocational rehabilitation of sensory handicapped veterans of World War II*, ALBERT E. CROFT, and *War damaged ears*, LAURA STOVEL.

The Policyholders Service Bureau of the Metropolitan Life Insurance Company is issuing the second in a series of studies on the subject of veteran employment, entitled *Re-employment of war veterans*. This discusses many of the problems in store for employers who contemplate the re-employment of discharged servicemen. Findings are limited to those questions which will be the concern of management in its planning for the postwar period. Of special interest are sections on demobilization plans, the U. S. Army's separation procedure, and Government agencies serving the veterans, both in the United States and Canada. The greater part of the report deals with company programs to meet postwar needs. The programs of several companies are outlined. Orders for this booklet may be placed with the Policyholders Service Bureau, Metropolitan Life Insurance Company, One Madison Avenue, New York City.